COMPAQ

ProLiant 5500 and 5500R

Maintenance and Service Guide

For use with Pentium II Xeon and Pentium III Xeon processor-based servers only

Second Edition (March 1999)
Part Number 328692-002
Spare Part Number 328704-002
Compaq Computer Corporation

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About This Guide

This Maintenance and Service Guide is a troubleshooting guide that can be used for reference when servicing ProLiant 5500 and 5500R Servers.

WARNING: To reduce the risk of personal injury from electrical shock and hazardous energy levels, only authorized service technicians should attempt to repair this equipment. Improper repairs could create conditions that are hazardous.

xx - xx kg
xx - xx lb

WARNING: Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely. To reduce the risk of personal injury or damage to the equipment, observe local Occupational Safety requirements and guidelines for heavy equipment handling.

WARNING: To reduce the risk of personal injury from electrical shock, the installation of options and servicing of this product must be performed by individuals who are knowledgeable of the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings:

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

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Compaq Technician Notes

WARNING: Only authorized technicians trained by Compaq should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

WARNING: To reduce the risk of personal injury from electric shock or damage to the equipment:

- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.
- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.

CAUTION: To properly ventilate your system, you must provide at least 12 inches (30.5 cm) of clearance at the front and back of the computer.

CAUTION: The computer is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Where to Go for Additional Help

In addition to this guide, the following information sources are available:

- User Documentation
- *Compaq Service Quick Reference Guide*
- Service Training Guides
- Compaq Service Advisories and Bulletins
- Compaq QuickFind
- Compaq Insight Manager
- Compaq Download Facility: Call 1-281-518-1418

Integrated Management Display

Some Compaq server models include a Compaq Integrated Management Display (IMD), an integrated, 16x4 character display mounted on the front of the server. This display provides easy-to-use menu-driven access to server information, including model number, LCD firmware revision, and POST operations.

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Telephone Numbers

For the name of your nearest Compaq Authorized Reseller:

- In the United States, call 1-800-345-1518
- In Canada, call 1-800-263-5868

For Compaq technical support:

- In the United States and Canada, call 1-800-386-2172
- For Compaq technical support phone numbers outside the United States and Canada, visit the Compaq website at:

  http://www.compaq.com

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Chapter 1

Illustrated Parts Catalog

Mechanical Parts Exploded View (Tower Model)

This chapter provides the illustrated parts breakdown and a spare parts list for Compaq ProLiant 5500 and 5500R Servers. See Table 1-1 for the names of referenced spare parts.

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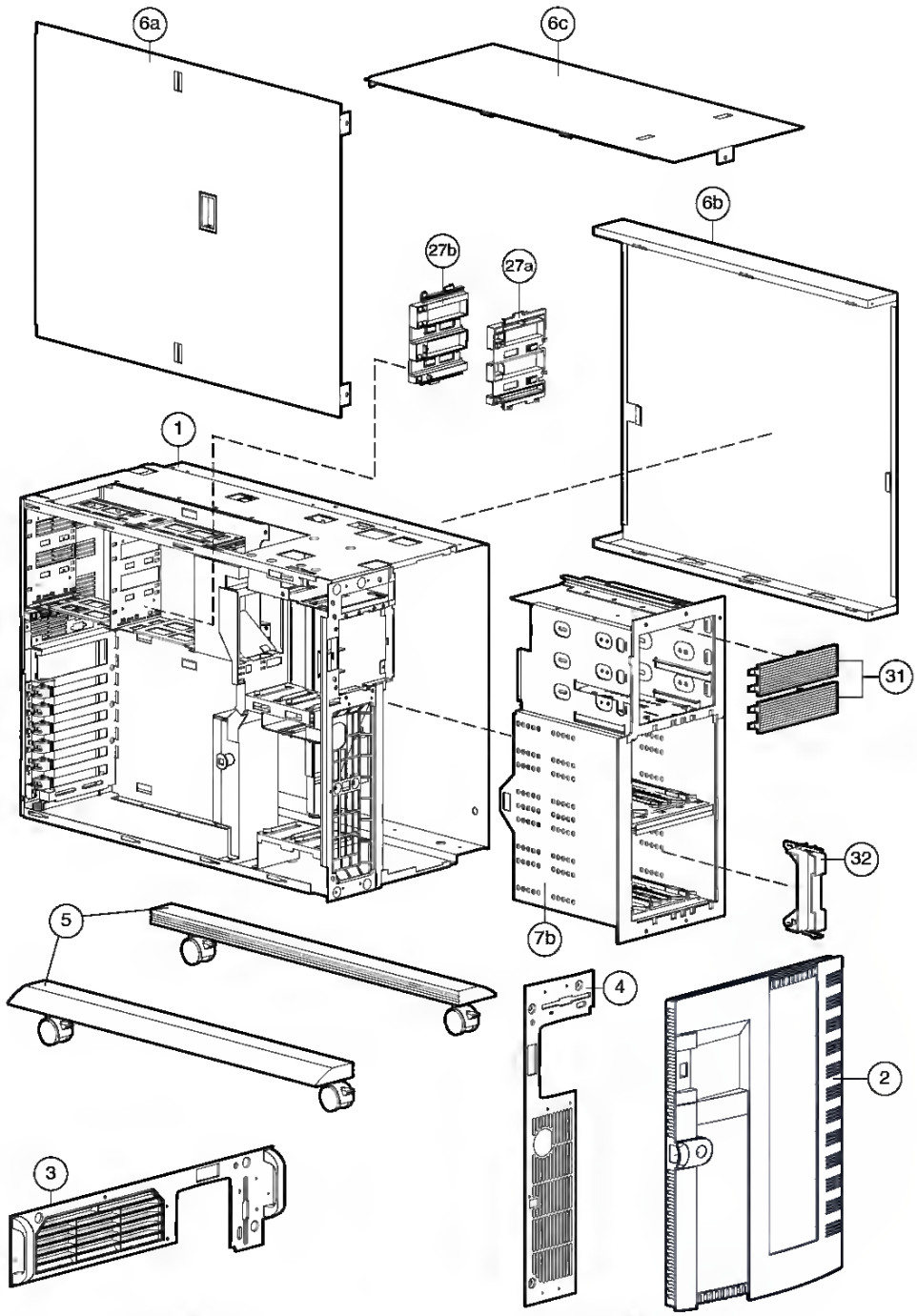

Figure 1-1. Exploded view, Compaq ProLiant 5500 and 5500R Server mechanical parts

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System Components Exploded View (Tower Model)

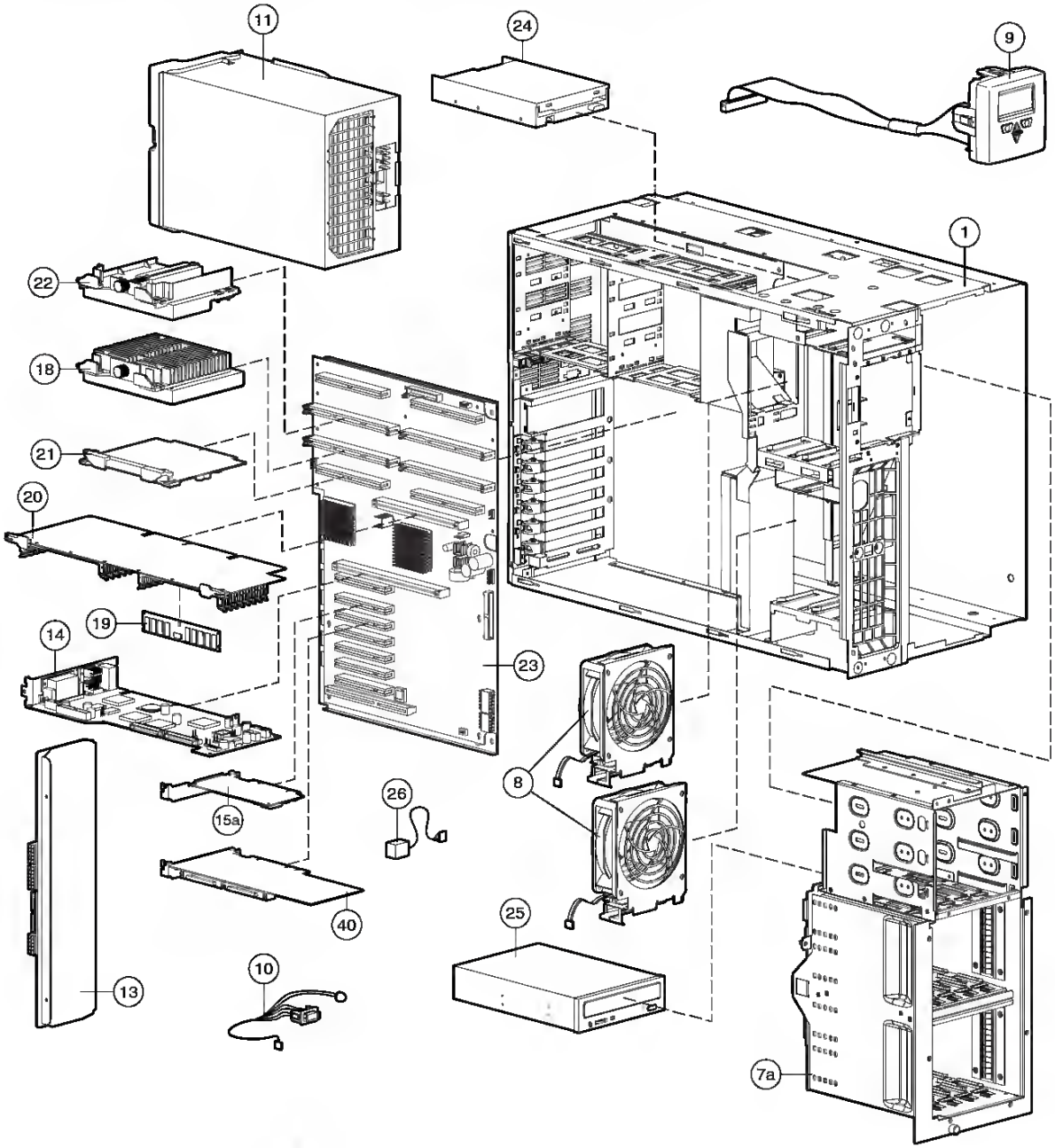

Figure 1-2. Exploded view, Compaq ProLiant 5500 and 5500R Server system components

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Spare Part List

Table 1-1
Spare Part List - Compaq ProLiant 5500 and 5500R Servers

Ref.	Description	Spare Part Number
CHASSIS		
1	Chassis	328698-001
2	Front Door Bezel	298360-001
3	Rack-Mount Bezel with Handle (Rack Model Only)	304431-001
4	Fixed Front Bezel	298361-001
5	Caster Mounting Plate with Casters (Tower Model Only)	330485-001
6	Panel Kit	328697-001
	a) Side Access Panel	
	b) U-Channel Access Panel	
	c) Top Access Panel	
ASSEMBLIES		
7a	Drive Cage with Ultra2 SCSI Backplane Board	328695-001
7b	Drive Cage with Wide Ultra SCSI Backplane Board	328696-001
8	Fan Assembly	326873-001
9	Integrated Management Display (IMD) with Cable (Std. in Rack Model)	271930-001
10	Power Switch and Cable	328710-001
SYSTEM CDMPDNENTS		
11	Hot-Plug Power Supply, 750W	169286-002
12	64-bit Dual Channel Wide Ultra2 SCSI Adapter	348759-001*
	BDARDS	
13	Power Backplane Board	306571-001
14	Peripheral Board	328702-001
15a	Compaq 10/100 TX PCI Intel UTP Controller	317606-001
15b	Compaq 10/100 TX PCI UTP Controller	169849-001*
16	400 MHz/100 (1 MB) Processor with Heat Sink	386980-001*
17	450 MHz/100 (1 MB) Processor with Heat Sink	387093-001*
18	500 MHz/100 (1 MB) Processor with Heat Sink	328700-001

continued

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Table 1-1
Spare Part List - Compaq ProLiant 5500 and 5500R Servers *continued*

Ref.	Description	Spare Part Number
19	Memory Module, 64-MB, 50ns or 60ns, EDD	281858-001
20	Memory Board	328703-001
21	Processor Power Module	328701-001
22	Processor Terminator Board	329271-001
23	System I/D Board with Tray	328699-001
	MEOIA STORAGE OEVICES	
24	1.44-MB Diskette Drive	160788-201
25	24X or greater IDE CD-RDM Drive	328369-001
	MISCELLANEOUS	
26	4.5V Replacement Battery	160274-001
27	Miscellaneous Plastics Kit a) Front Processor Guide b) Rear Processor Guide c) Single Board Guide * d) Common Board Guide *	330645-001
28	Miscellaneous Slot Cover Kit	271918-001 *
29	Miscellaneous Power Cable Kit a) Power Logic Cable Assembly b) LCD Backplane Adapter Cable Assembly c) 14-Inch Diskette Power Cable Assembly d) 12-Position Power Cable Assembly	328708-001 *
30	Miscellaneous Signal Cable Kit a) Diskette Drive Cable b) 68-Position, 46-Inch Cable Assembly c) Hard Drive Data and 7-Inch CD-RDM Cable Assembly d) 12-Position Power Cable Assembly e) Wide SCSI Signal Cable with Terminator	328709-001*
31	Removable Media Blank Bezel	306567-001
32	Hot-Plug Hard Drive Blank 1.6-Inch	189987-001
33	Hot-Plug Hard Drive Blank 1.3-Inch	296200-001 *
34	Hot-Plug Hard Drive Blank 1.0-Inch	122759-001 *
35	Rack Conversion Kit	304429-001 *
36	Return Kit	328706-001 *
37	Carton and Buns (International)	328706-002 *
38	Maintenance and Service Guide	328704-001 *
39	Illustrated Parts Map	328705-001 *

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Table 1-1
Spare Part List - Compaq ProLiant 5500 and 5500R Servers *continued*

Ref.	Description	Spare Part Number
OPTIONS		
40	64-bit Dual Channel Wide Ultra2 SCSI Adapter	348759-001
41	Smart Array 3200 Controller	340855-001*
42	Keyboard (Tower Model Only)	160648-XXX *
43	Drive Cage with Duplex SCSI Backplane Board	328696-001 *
44	4.3-GB Hot-Plug Wide-Ultra SCSI-3, 10,000 rpm Hard Drive	336380-001 *
45	9.1-GB Hot-Plug Wide-Ultra SCSI-3, 10,000 rpm Hard Drive	336381-001 *
46	9.1-GB Hot-Plug Wide-Ultra SCSI-3 Hard Drive	313715-001 *
47	18.2-GB Hot-Plug Wide-Ultra SCSI-3 Hard Drive	336382-001 *
48	18.2-GB Hot-Plug Wide-Ultra SCSI-3, 10,000 rpm Hard Drive	336382-001 *
49	Memory Module, 32-MB, 50ns, EDO	281857-001 *
50	Memory Module, 128-MB, 50ns, EDO	281859-001 *
51	Memory Module, 256-MB, 50ns, EDO	281860-001 *

* Not Shown

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Chapter 2

Removal and Replacement Procedures

This chapter provides subassembly/module-level removal and replacement procedures for Compaq ProLiant 5500 and 5500R Servers. After completing all necessary removal and replacement procedures, run the diagnostics program to verify that all components operate properly.

To service Compaq ProLiant 5500 and 5500R Servers, the following items are recommended:

- Torx T-15 screwdriver
- Phillips screwdriver
- From the Compaq SmartStart and Support Software CD:
  - System configuration utility software
  - Drive Array Advanced Diagnostics software
  - Diagnostics software

Electrostatic Discharge Information

A discharge of static electricity can damage static-sensitive devices or microcircuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. To prevent electrostatic damage, observe the following precautions:

- Transport products in static-safe containers such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Cover servers or work area with approved static-dissipating material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and foam packing.
- Make sure you are properly grounded when touching a static-sensitive component or assembly.
- Avoid touching pins, leads, or circuitry.
- Always place drives PCB (Printed Circuit Board) assembly side down.
- Use conductive field service tools.

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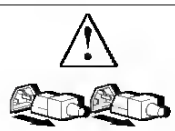
Symbols in Equipment

WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists. To reduce risk of injury from a hot component, allow the surface to cool before touching.

WARNING: Any surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. The enclosed area contains no operator serviceable parts. To reduce the risk of injury from electrical shock hazards, do not open this enclosure.

WARNING: Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection. To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle

WARNING: This label or its equivalent is located on the surface of your CD-ROM drive. This label indicates that the product is classified as a CLASS 1 LASER PRDDUCT.



WARNING: Power supplies or systems marked with these symbols indicate the equipment is supplied by multiple sources of power. To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.

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Preparation Procedures

The access panels can be removed while the server is turned on without causing system shutdown. Auxiliary power (+5V) will remain in the exposed areas.

WARNING: Compaq ProLiant 5500 and 5500R Servers are capable of producing energy levels that are considered hazardous.

WARNING: To completely remove all power from the system, you must disconnect the power cord from the server. In systems with multiple power supplies, you must disconnect all the power cords to completely remove power from the system.

IMPORTANT: It is not necessary to turn off the server to replace hot-plug devices such as hot-plug power supplies.

Before beginning any of the removal and replacement procedures for non-hot-plug devices:

1. Power down the server.
2. Disconnect the AC power cord(s) from the AC outlet(s), then from the server.
3. Disconnect all external peripheral devices from the server.
4. If the server is in a rack-mount configuration, you must remove the server from the rack and place it on a sturdy table or workbench to perform some removal and replacement procedures. Refer to the *Compaq ProLiant 5500 and 5500R Setup and Installation Guide* for instructions.

WARNING: To reduce the risk of personal injury or property damage, you must take precautions to provide for rack stability and safety. Heed all cautions and warnings throughout the installation instructions that come with the server.

WARNING: To reduce the risk of personal injury, do not attempt to remove the server from the rack by yourself. A minimum of two people are required to remove the server from the rack.

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WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Install the power supply before connecting the power cord to the power supply.
- Unplug the power cord before removing the power supply from the server.
- If the system has multiple power supplies, disconnect power from the system by unplugging all power cords from the power supplies.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation procedure. Refer to the section titled "Electrostatic Discharge" for more information.

Rack Warnings

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor
- The full weight of the rack rests on the leveling jacks
- The stabilizers are attached to the rack and are fully extended if it is a single rack installation
- Multiple racks are coupled together in multiple-rack installations
- No more than one component is extended at a time
- The heaviest item is loaded first and at the bottom of the rack
- The equipment is properly supported/braced when installing options and cards

WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack.

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Server Warnings and Precautions

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

43 kg
95 lb

WARNING: To reduce the risk of personal injury or damage to the equipment:

- Observe local Occupational Safety requirements and guidelines for heavy equipment handling.
- Obtain adequate assistance to lift and stabilize the product during installation or removal.
- Remove all pluggable power supplies and modules to reduce the weight of the product.
- The product will be unstable when not mated with the rails.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect power from the server by unplugging the power cord from either the electrical outlet or the server.

WARNING: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

CAUTION: The ProLiant 5500 and 5500R server must always be operated with the system unit cover on. Proper cooling will not be achieved if the system unit cover is removed.

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Caster Mounting Plate (Tower)

To remove the caster mounting plate:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Place the server on its side.
3. Remove the four T-15 screws securing the caster mounting plate to the server.
4. Pull the caster mounting plate assembly away from the server.

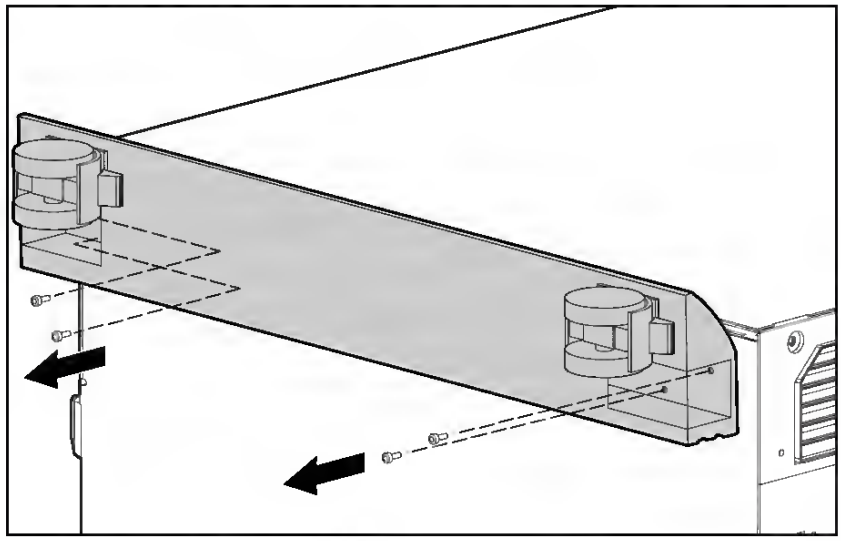

Figure 2-1. Removing the caster mounting plate

Reverse steps 1 through 4 to replace the caster mounting plate.

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Front Bezel Door (Tower)

To remove the front bezel door:

1. Swing the front bezel door open approximately 45 degrees.
2. Lift the front bezel door up, then pull it away from the chassis.

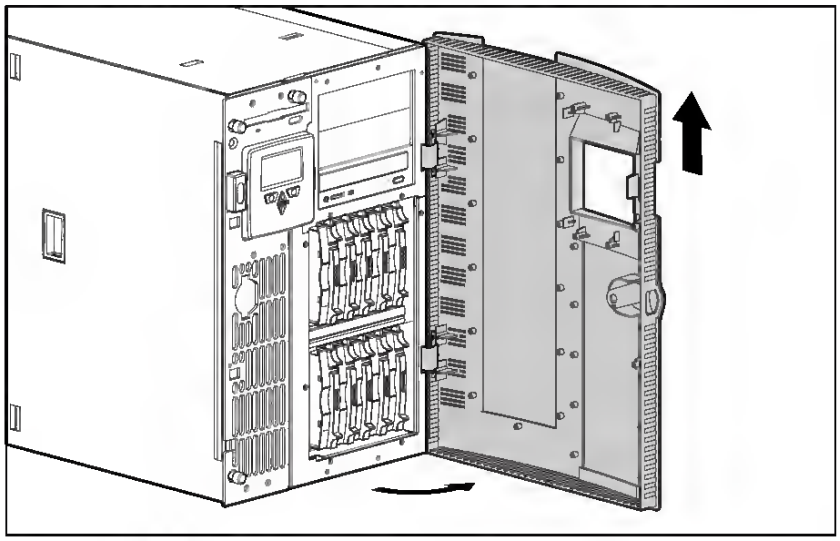

Figure 2-2. Removing the front bezel door

Reverse steps 1 and 2 to replace the front bezel door.

NOTE: Your server may appear different than the servers shown.

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Fixed Front Bezel

To remove the fixed front bezel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the front bezel door (tower model only).
3. Remove the seven T-15 screws securing the fixed front bezel to the chassis.
4. Pull the fixed front bezel away from the chassis.

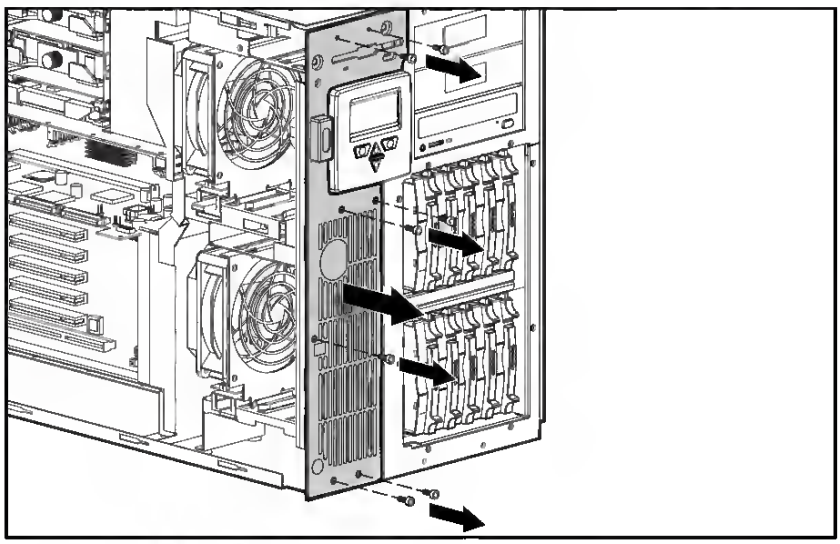

Figure 2-3. Removing the fixed front bezel

Reverse steps 1 through 4 to replace the fixed front bezel.

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Side Access Panel

The side access panel can be removed while the server is turned on without causing system shutdown. Auxiliary power (+5V) will remain in the exposed areas.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: To reduce the risk of server shutdown and subsequent data loss or damage to the equipment, use extreme care when running the Compaq ProLiant 5500 and 5500R with covers or access panels removed. Access panels are an integral part of the cooling system and removing them while the system is running may cause component stress or overheating.

To remove the side access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Open the front bezel door (tower model only).
3. Using a Torx T-15 screwdriver, loosen then unscrew the two thumbscrews securing the side access panel to the chassis.
4. Pull the side access panel back and away from the chassis.

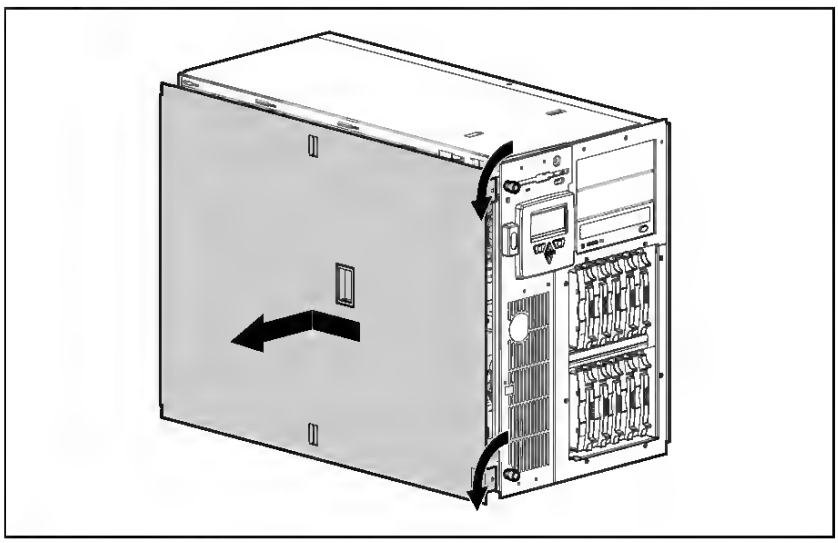

Figure 2-4. Removing the side access panel

Reverse steps 1 through 4 to replace the side access panel.

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Top Access Panel

The top access panel must be removed to access the I/O board. The access panel can be removed while the server is turned on without causing system shutdown, but auxiliary power (+5V) will remain in the exposed areas.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching them.

CAUTION: To reduce the risk of server shutdown and subsequent data loss or damage to the equipment, use extreme care when running the server with the covers or access panels removed. Access panels are an integral part of the cooling system and removing them while the system is running may cause component stress or overheating.

To remove the top access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Open the front bezel door (tower model only).
3. Use a Torx T-15 screwdriver to loosen the thumbscrew securing the top access panel to the front of the chassis.
4. Slide the top access panel back, then lift it from the chassis.

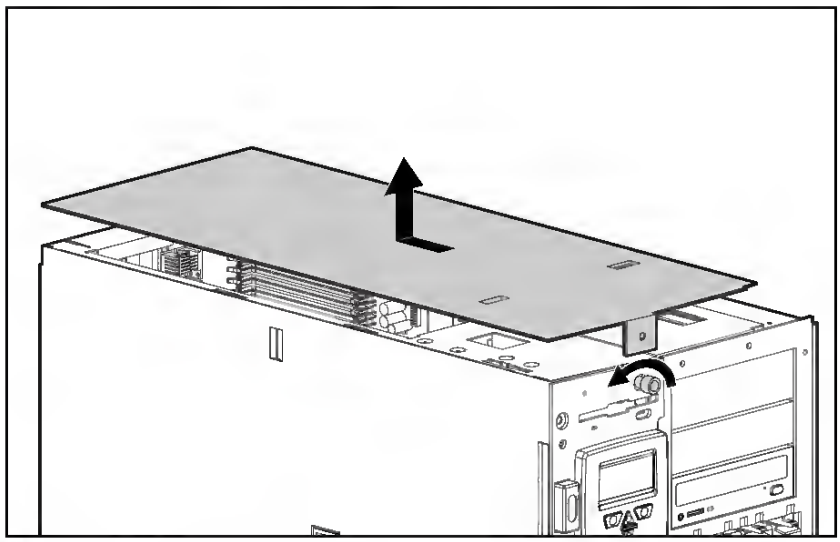

Figure 2-5. Removing the top access panel

Reverse steps 1 through 4 to replace the top access panel.

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U-Channel Access Panel

To remove the U-cbannel access panel:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the drive cage assembly. See "Drive Cage Assembly" later in this chapter.
3. Slide the U-channel access panel forward, then pull it away from the chassis.

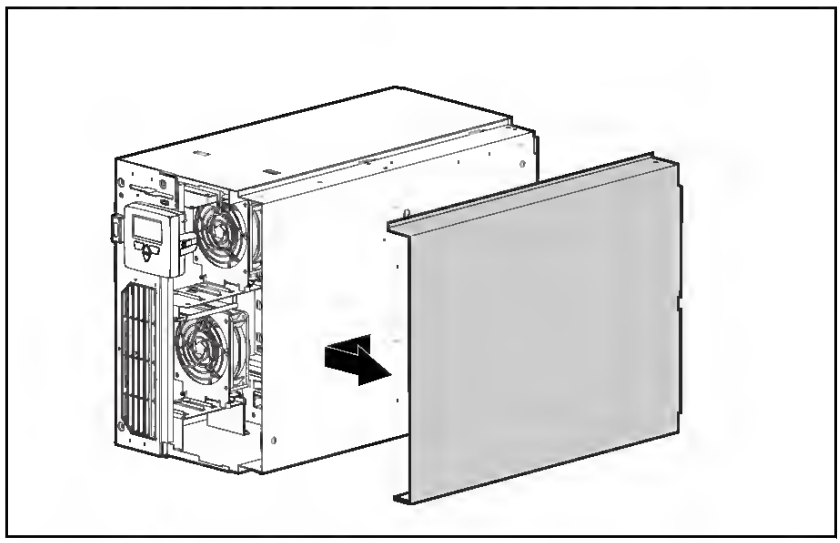

Figure 2-6. Removing the U-channel access panel

Reverse steps 1 through 3 to replace the U-channel access panel.

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Fans

Compaq ProLiant 5500 and 5500R Servers ship with at least two 120mm fans (in positions and). The figure below illustrates the location of the front fans. Positions and provide fan redundancy.

IMPORTANT: Redundant fans must be added in pairs. Positions and must be added together; positions and must be added together.

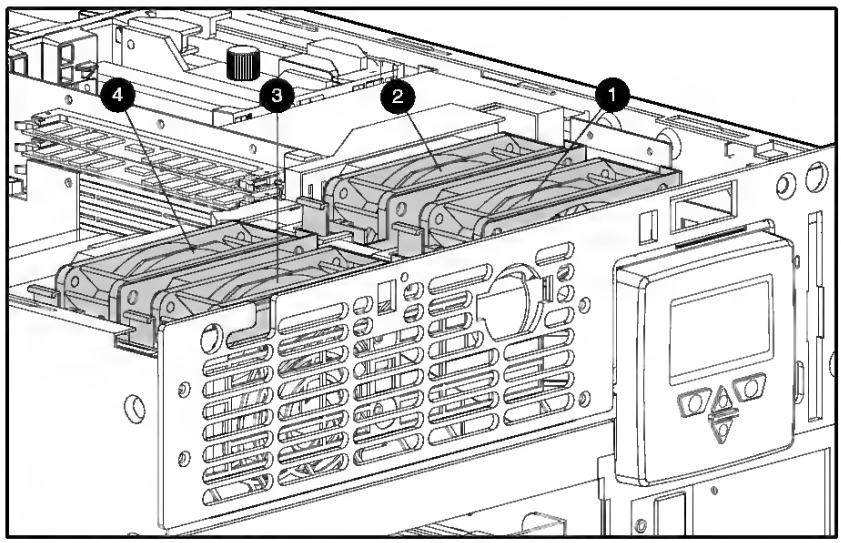

Figure 2-7. Location of fans, front view (rack model)

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To remove a front fan:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Disconnect the fan controller cable .

IMPORTANT: Fan cables and locations are numbered. Make sure each fan cable is connected to the corresponding fan.

4. Push up the latch on the side of the fan .
5. Lift the fan straight out of the chassis .

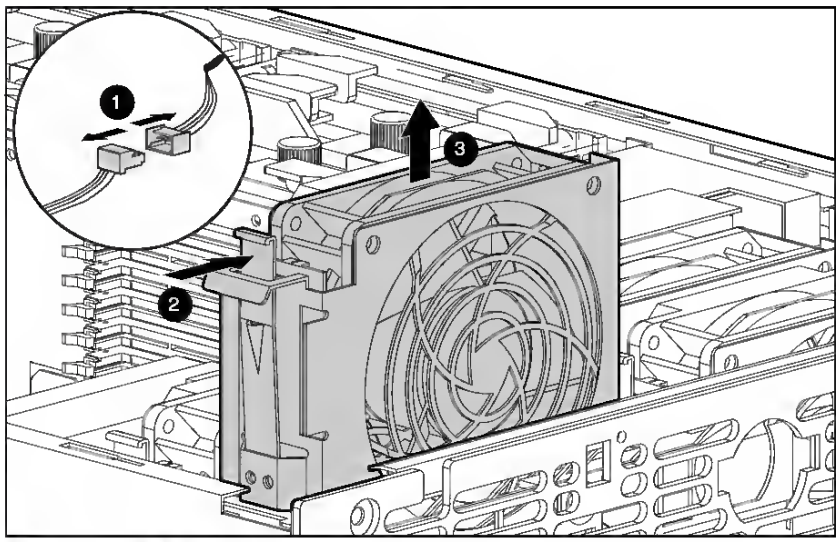

Figure 2-8. Removing a front fan

Reverse steps 1 through 5 to replace a front fan.

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Media Storage

Compaq ProLiant 5500 and 5500R Servers can house up to 14 media devices, including:

- A preinstalled 3.5-inch 1.44-MB diskette drive
- Two half-beight drive bays (removable media area)
- Preinstalled 24X or greater IDE CD-ROM drive
- Hot-Plug SCSI Drive Cage: 10 Ultra2 drives
  - Simplex Mode: seven 1-inch drives or six 1.6-inch drives
  - Duplex Mode: eigbt 1-inch drives or six 1.6-incb drives (optional)

NOTE: Compaq ProLiant 5500 and 5500R Servers ship as tower or rack models. Figure 2-9 shows both ProLiant models, and together with Table 2-1, shows the drive bay locations.

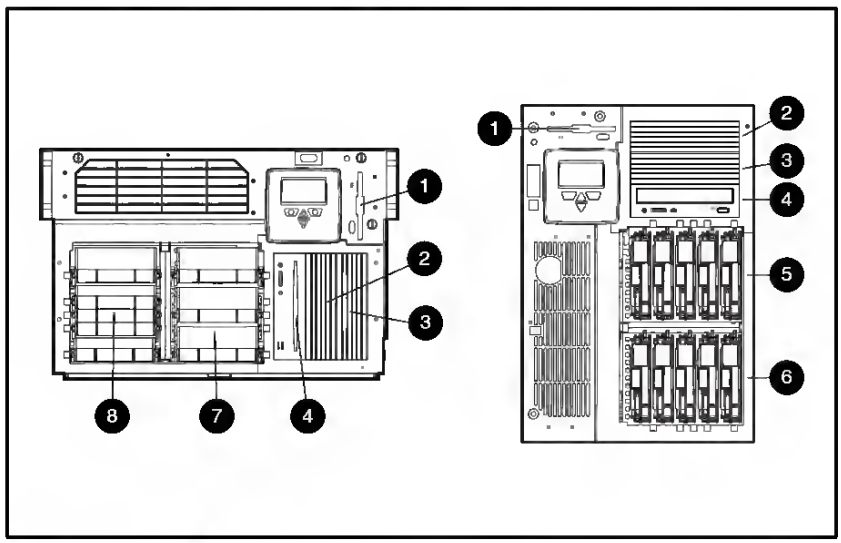

Figure 2-9. Server drive bay locations, rack, tower

NOTE: Wide Ultra drive cage is shown on rack view.

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Table 2-1
Drive Position Descriptions

Drive Position	Description
❶	3.5-inch x 1-inch device (1.44-MB standard diskette drive)
❷	5.25-inch x 1.6-inch device (removable media area)
❸	5.25-inch x 1.6-inch device (removable media area)
❹	Standard 24X or greater IDE CD-ROM Drive
❺	Drive Bay B: Five 1.0" Ultra2 hot-plug hard drives
❻	Drive Bay A: Five 1.0" Ultra2 hot-plug hard drives
	Drive Bay B: Three 1.6-inch or three 1-inch hot-plug Wide-Ultra hard drives
	Drive Bay A: Three 1.6-inch or four 1-inch hot-plug Wide-Ultra hard drives

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Drive Cage Assembly

To remove the drive cage assembly:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Open the front bezel door (tower model only).

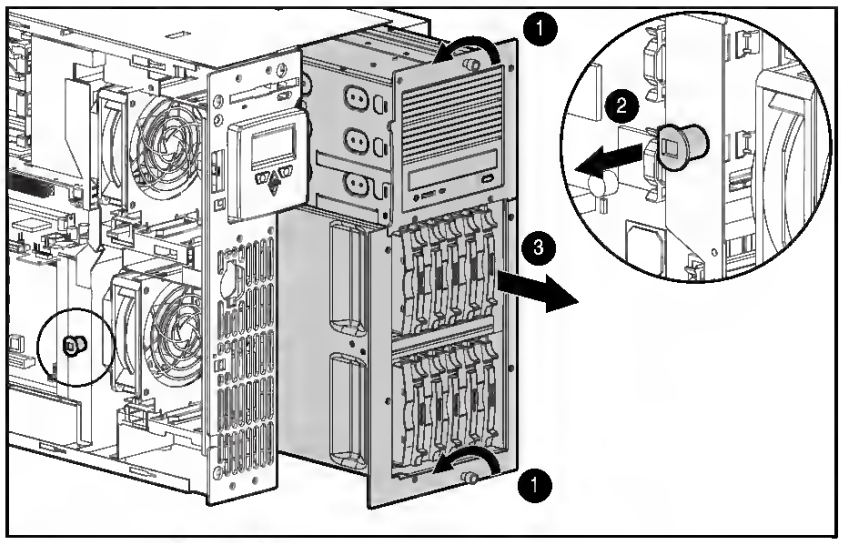

Figure 2-10. Removing the drive cage assembly

4. Loosen the two thumbscrews securing the drive cage to the front of the chassis .
5. Pull out the plunger mechanism securing the drive cage assembly to the chassis .
6. Pull the drive cage partially from the chassis to allow better access to cables.
7. Disconnect all cables.
8. Slide the drive cage assembly out the front of the chassis .

Reverse steps 1 through 8 to replace the drive cage assembly.

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Hot-Plug Hard Drives

CAUTION: To reduce the risk of data loss, remove a hot-plug drive only when the drive LED is amber. Do not remove a hot-plug drive if the online LED is green.

Ultra2 Hard Drives

1. Open the front bezel door.
2. Press the release tab and open the locking lever that holds the drive in place.
3. Pull the drive from the cage .

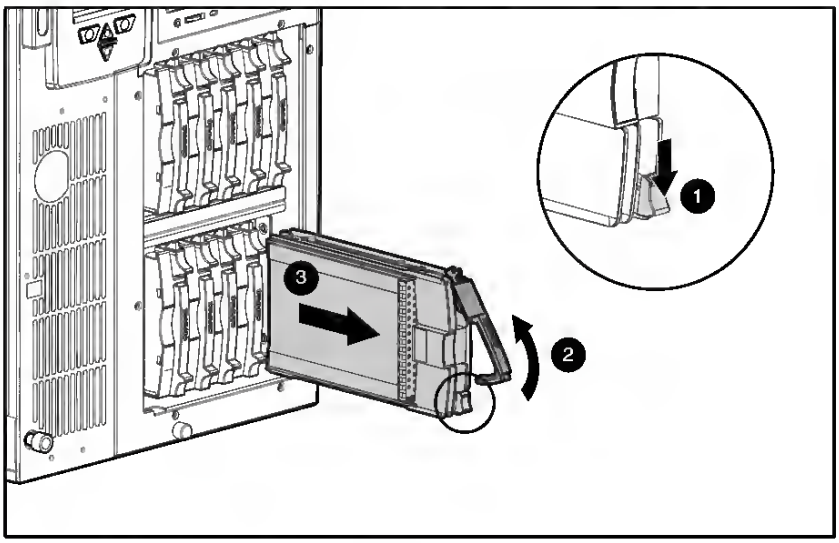

Figure 2-11. Removing a hot-plug hard drive

Reverse steps 1 through 3 to replace a hot-plug hard drive.

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Wide Ultra Hard Drives

1. Open the front bezel door.
2. Press the release tabs and open the locking levers that hold the drive in place.
3. Pull the drive from the cage .

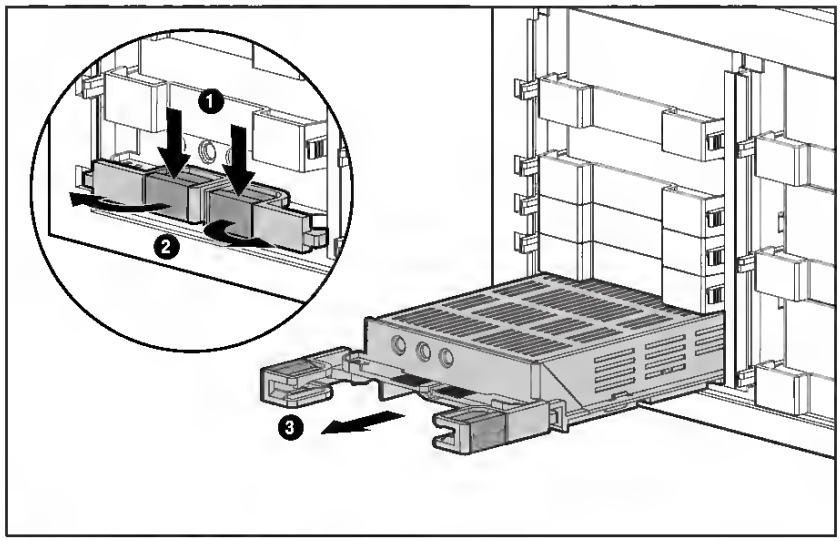

Figure 2-12. Removing a hot-plug hard drive

Reverse steps 1 through 3 to replace a Wide Ultra hot-plug hard drive.

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Removable Media

To remove a drive from the removable media area:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the drive cage assembly. See "Drive Cage Assembly" earlier in this chapter.
3. Disconnect the power and signal cables from the removable media device.
4. Remove the four T-15 screws securing the removable media panel to the drive cage assembly .
5. Pull the removable media panel away from the drive cage assembly.
6. Remove the four T-15 screws securing the drive to the drive cage assembly .
7. Pull the drive out the front of the drive cage assembly .

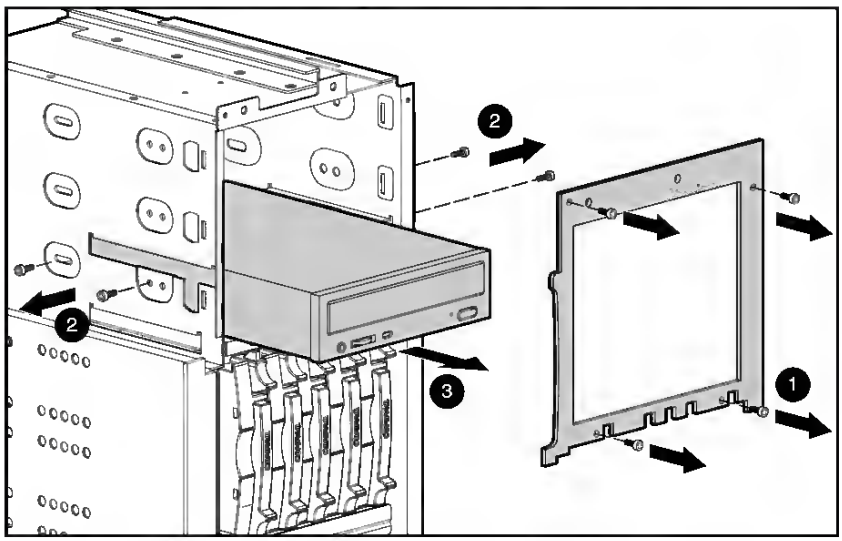

Figure 2-13. Removing the CD-ROM drive from the removable media area

Reverse steps 1 through 7 to replace a drive in the removable media area.

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1.44-MB Diskette Drive

To remove the diskette drive:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
4. Remove the front fan nearest to the diskette drive. See "Fans" earlier in this chapter.
5. Disconnect all diskette drive cables.
6. Remove the screw on the side of the diskette drive.
7. Pull the drive back, then lift it through the top of the chassis.

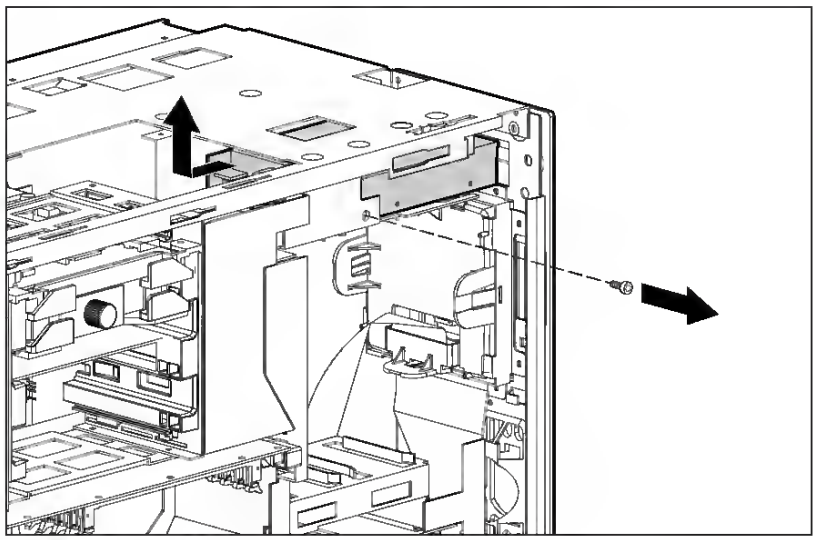

Figure 2-14. Removing the diskette drive

Reverse steps 1 through 7 to replace the diskette drive.

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SCSI and CD-ROM Cable Connection Diagram

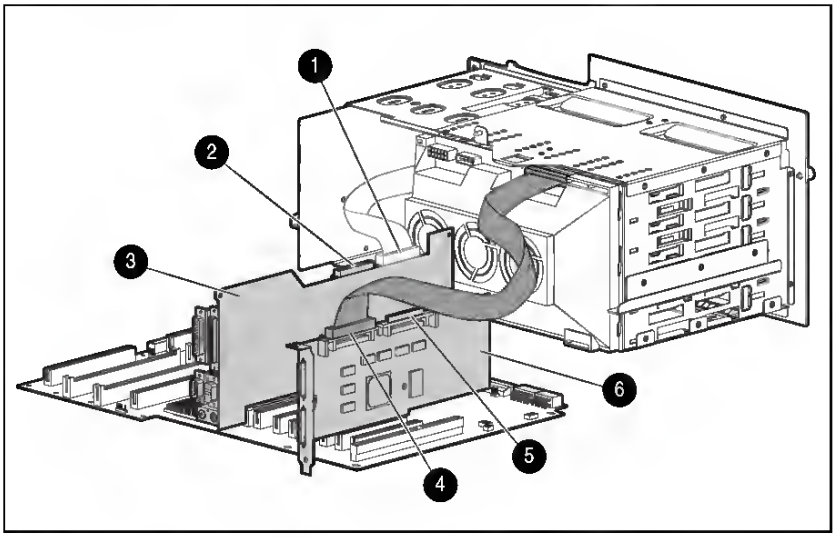

Figure 2-15. Ultra2 SCSI and CD-ROM cable connection diagram

Table 2-2
Cable Connection Descriptions

Cable Connection	Description
	SCSI port 1 on Peripheral Board
	SCSI Connector 2 on Peripheral Board
	Peripheral Board
	SCSI port 1 on 64-bit Dual Channel Wide Ultra2 SCSI Adapter Board
	SCSI port 2 on 64-bit Dual Channel Wide Ultra2 SCSI Adapter Board
	64-bit Dual Channel Wide Ultra2 SCSI Adapter Board

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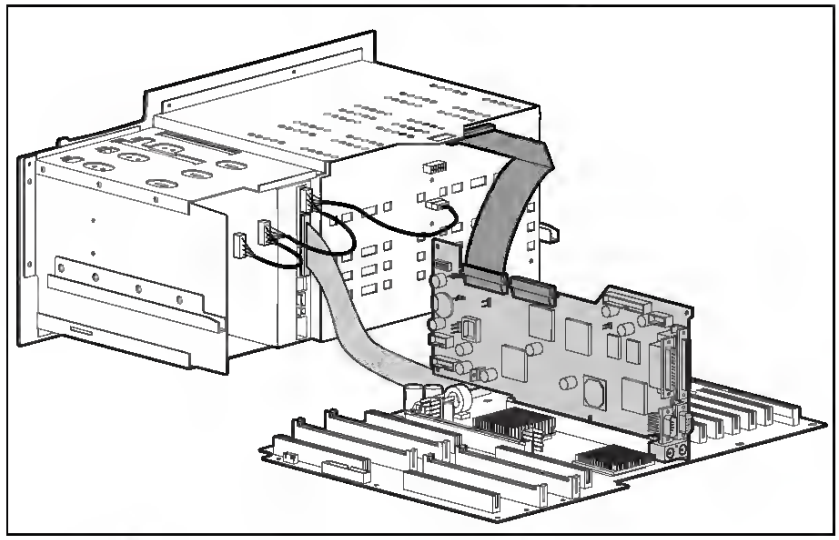

Figure 2-16. Wide Ultra SCSI and CD-ROM cable connection diagram

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Integrated Management Display (IMD)

To remove the IMD:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Open the front bezel door (tower model only).
3. Remove the fixed front bezel. See "Fixed Front Bezel" earlier in this chapter.
4. Remove the front fans. See "Fans" earlier in this chapter.
5. Remove the drive cage assembly. See "Drive Cage Assembly" earlier in this chapter.
6. Disconnect the IMD cable from the IMD extension cable .

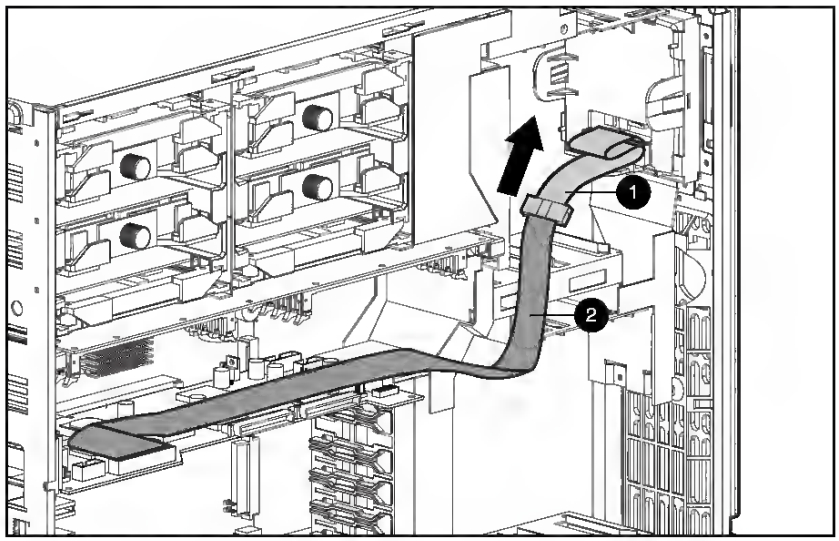

Figure 2-17. Disconnecting the IMD cable from the IMD extension cable

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7. Press the four latches on the rear of the IMD .
8. Pull the IMD out the front of the server .

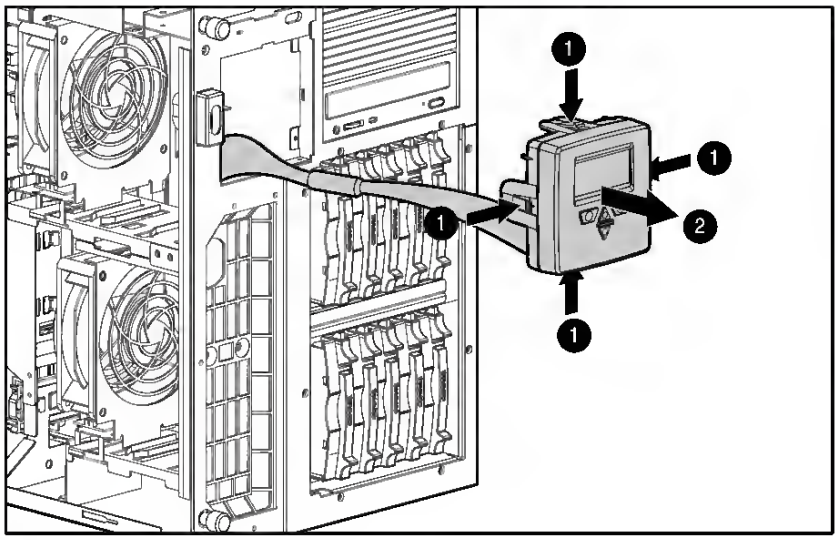

Figure 2-18. Removing the IMD

Reverse steps 1 through 8 to replace the IMD.

IMPORTANT: Make sure all power and signal cables to the drive cage assembly are reseated properly.

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Power Switch with LED

WARNING: To completely remove all power from the system, you must disconnect the power cord from the server. In systems with multiple power supplies, you must disconnect all the power cords to completely remove power from the system.

To remove the power switch from the Compaq ProLiant 5500 and 5500R:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the fixed front bezel. See "Fixed Front Bezel" earlier in this chapter.
3. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
4. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
5. Remove fans. See "Fans" earlier in this chapter.
6. Unplug the power switch cable from the peripheral board.
7. Unplug the power LED from the front wall.
8. Press on the top and bottom of the switch from inside the chassis , and pull the switch assembly out the front of the server .

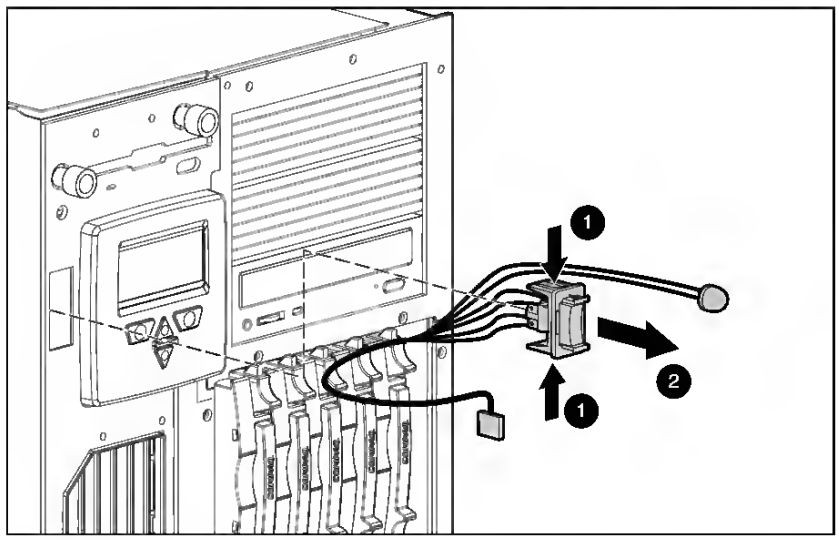

Figure 2-19. Removing the power switch

Reverse steps 1 through 8 to replace the power switch.

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Processor, Processor Power Module, and Terminator Board Locations

IMPORTANT: A processor power module must be installed in the slot next to each processor. Each processor slot must either be populated by a processor or terminator board for proper bus termination.

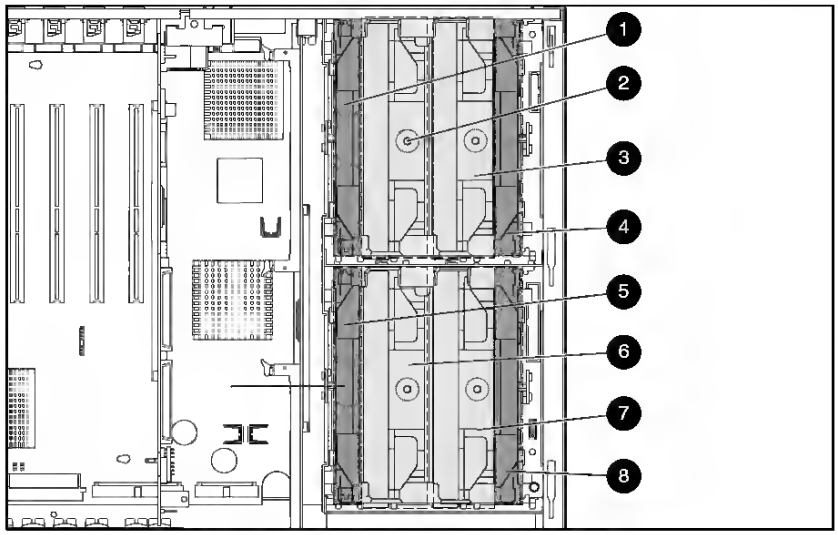

Figure 2-20. Location of processor, processor power module, and terminator boards

Table 2-3
Location of Processor, Processor Power Module, and Terminator Modules

Location	Description
	Processor Power Module 4
	Processor 4 or Terminator Module 4
	Processor 3 or Terminator Module 3
	Processor Power Module 3
	Processor Power Module 2
	Processor 2 or Terminator Module 2
	Processor 1 or Terminator Module 1
	Processor Power Module 1

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Processor Removal

Compaq ProLiant 5500 and 5500R Servers support up to four processors, each with its own heat sink. To remove a processor:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.

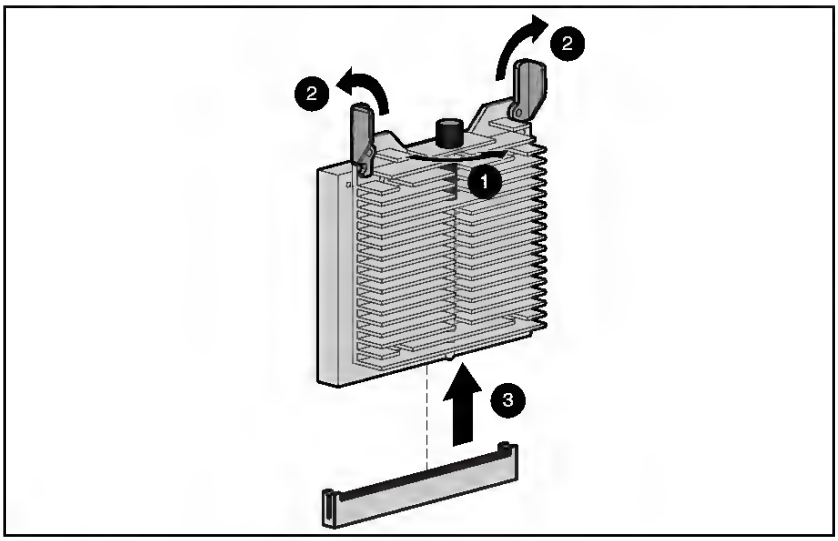

Figure 2-21. Removing the processor

3. Loosen the captive screw .
4. Pull up the ejector levers .
5. Lift the processor out of the connector socket .

Reverse steps 1 through 5 to replace the processor.

NOTE: If not replacing the processor, install a processor terminator module in its place.

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Processor Power Module

Each processor requires one processor power module. If a module become defective, it must be replaced. To replace a processor power module:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Pull up the ejector levers .
4. Lift the processor power module out of the connector socket .

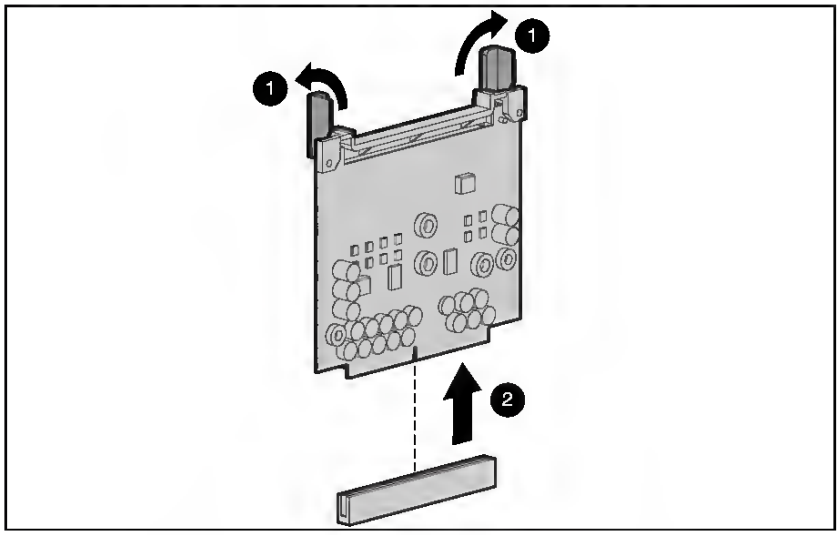

Figure 2-22. Removing the processor power module

NOTE: The processor power module must be installed in the slot next to the processor. See Figure 2-19 for processor power module locations.

Reverse steps 1 through 4 to replace the processor power module.

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Processor Terminator Modules

Processor Terminator boards must be installed in processor slots that are not in use; they are removed when installing additional processors.

NOTE: Seat processor terminator boards securely in processor slots that are not in use.

To remove a processor terminator board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Loosen the captive screw .
4. Pull up the ejector levers .
5. Lift the terminator board out of the connector socket.

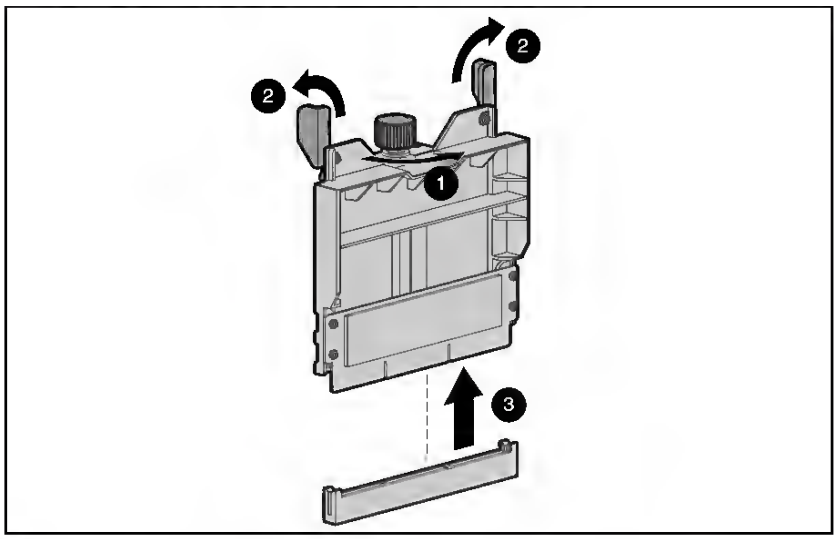

Figure 2-23. Removing the processor terminator board

Reverse steps 1 through 5 to replace a processor terminator board.

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Peripheral Board

The peripheral board is removed for replacement, to access the connectors and switches on the board, or to access the system I/O board. To remove the peripheral board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.

CAUTION: Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning any installation or removal procedure. Refer to the section titled "Electrostatic Discharge" for more information.

3. Remove all cables from the back of the peripheral board.

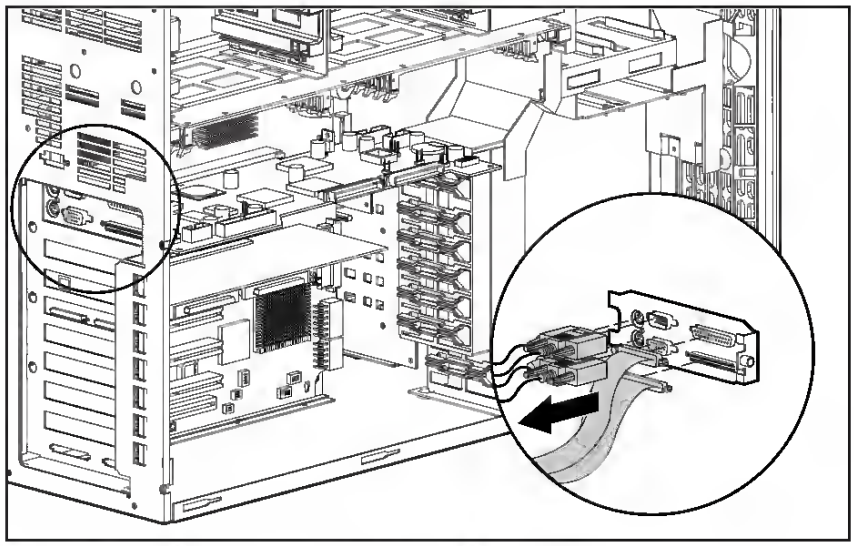

Figure 2-24. Removing cables from the back of the peripheral board

4. Disconnect all cables from the peripheral board.
5. Loosen the two spring-loaded screws using a Phillips screwdriver.

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6. Pull the peripheral board out from its slot.

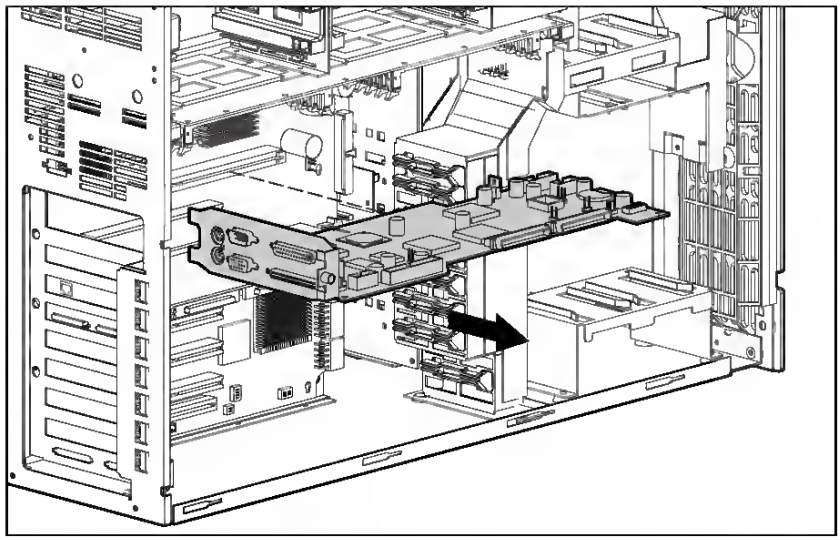

Figure 2-25. Removing the peripheral board

Reverse steps 1 through 6 to replace the peripheral board.

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Memory

Compaq ProLiant 5500 and 5500R Servers:

- Support buffered-EDO, 60-ns or faster, 32-, 64-, 128-, or 256-megabyte DIMMs.
- Support up to 4 gigabytes of memory.
- Support up to four memory banks, each bank consisting of four DIMMs. Install or remove one bank at a time. Each DIMM of a given bank must be of the same size, type, speed, and manufacturer.

CAUTION: Use only Compaq EDD, ECC DIMMs. DIMMs from other sources may adversely affect data integrity. Power-On Self-Test (POST) will warn of non-supported DIMMs.

NOTE: If you mix banks of 50-ns and 60-ns DIMMs, the entire memory subsystem will be adjusted to run at the slower DIMM speed.

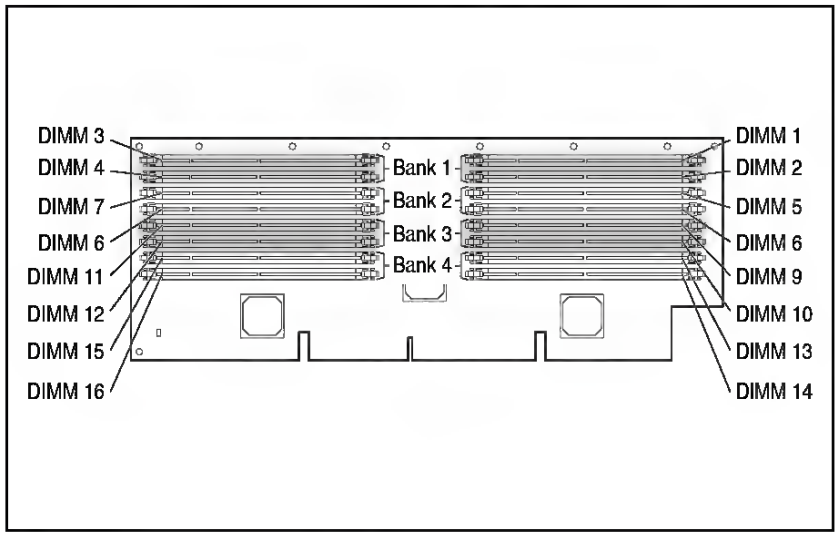

Figure 2-26. Memory banks on the memory board

The recommended DIMM installation order is:

- Bank One – DIMM 1, DIMM 2, DIMM 3, DIMM 4
- Bank Two – DIMM 5, DIMM 6, DIMM 7, DIMM 8
- Bank Three – DIMM 9, DIMM 10, DIMM 11, DIMM 12
- Bank Four – DIMM 13, DIMM 14, DIMM 15, DIMM 16

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The following table shows some of the possible memory upgrade configurations for Compaq ProLiant 5500 and 5500R Servers. Four identical DIMMs (a bank) must be installed or removed at a time. The size, speed, and manufacturer of each DIMM in a given bank must be identical.

Table 2-4
Examples of DIMM Upgrade Combinations

Total Memory	Bank 1	Bank 2	Bank 3	Bank 4
256 MB	4 x 32 MB	4 x 32 MB		
384 MB	4 x 32 MB	4 x 32 MB	4 x 32 MB	
512 MB	4 x 32 MB	4 x 32 MB	4 x 32 MB	4 x 32 MB
512 MB	4 x 64 MB	4 x 64 MB		
768 MB	4 x 64 MB	4 x 64 MB	4 x 64 MB	
1.024 GB	4 x 64 MB	4 x 64 MB	4 x 64 MB	4 x 64 MB
1.536 GB	4 x 128 MB	4 x 128 MB	4 x 128 MB	
2.048 GB	4 x 128 MB	4 x 128 MB	4 x 128 MB	4 x 128 MB
2.048 GB	4 x 256 MB	4 x 256 MB		
3.072 GB	4 x 256 MB	4 x 256 MB	4 x 256 MB	
4.096 GB	4 x 256 MB	4 x 256 MB	4 x 256 MB	4 x 256 MB

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Memory Board

To remove the memory board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Pull the locking levers outward on each end of the memory expansion board.
4. Pull the memory board from the system I/O board .

NOTE: The illustration below shows the server placed on its side. It is not necessary to place the server on its side to remove the memory board.

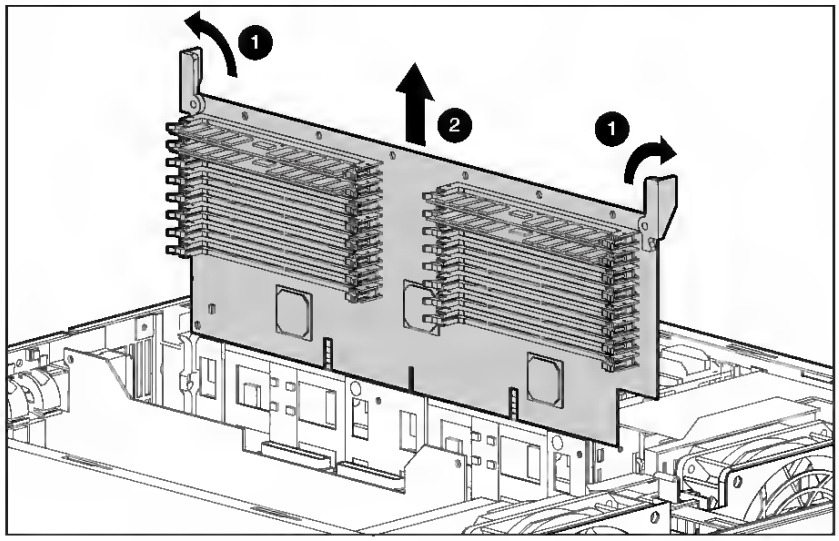

Figure 2-27. Removing the memory board

Reverse steps 1 through 4 to replace the memory board.

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Dual Inline Memory Modules (DIMMs)

Compaq ProLiant 5500 and 5500R Servers have a maximum of four memory banks on the memory expansion board. Each bank has four sockets.

CAUTION: Use only Compaq DIMMs. DIMMs from other sources may adversely affect data integrity. Power-On Self-Test (POST) will warn of non-supported DIMMs.

To remove a DIMM:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Remove the memory board and place it on a nonconductive work surface. See "Memory Board" earlier in this chapter.
4. Pull the levers out at each end of the DIMM .
5. Pull the DIMM from the socket .

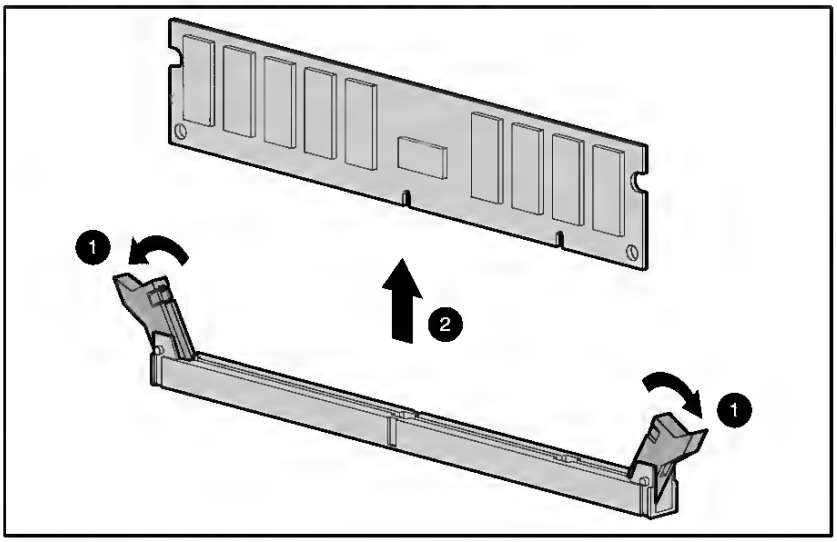

Figure 2-28. Removing a DIMM

Reverse steps 1 through 5 to replace a DIMM. Align the key slot on the bottom edge of each DIMM with the tab in the socket before seating the DIMM in the socket.

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64-bit Dual Channel Wide Ultra2 SCSI Adapter

Compaq ProLiant 5500 and 5500R Ultra2 Model Servers contain seven I/O expansion slots:

- Six dedicated PCI slots: one occupied by a preinstalled Network Interface Controller and one occupied by a 64-bit Dual Channel Wide Ultra2 SCSI Adapter
- One shared PCI/ISA slot

To remove a 64-bit Dual Channel Wide Ultra2 SCSI Adapter:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in tbis cbapter.
3. Disconnect any cables from the controller.
4. Open the slot release lever by pressing on its ribbed area .
5. Gripping each end of the controller, gently remove it without disturbing other installed boards .

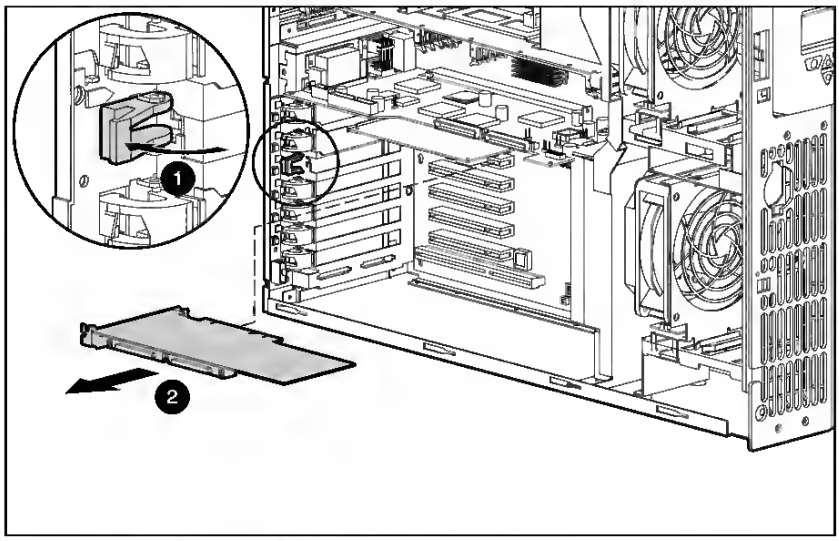

Figure 2-29. Removing the 64-bit Dual Channel Wide Ultra2 SCSI Adapter

Reverse steps 1 througb 5 to replace the 64-bit Dual Cbannel Wide Ultra2 SCSI Adapter.

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Network Interface Controller (NIC)

To remove a NIC:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Disconnect any cables from the controller.
4. Open the slot release lever by pressing on its ribbed area .
5. Gripping each end of the controller, gently remove it without disturbing other installed boards .

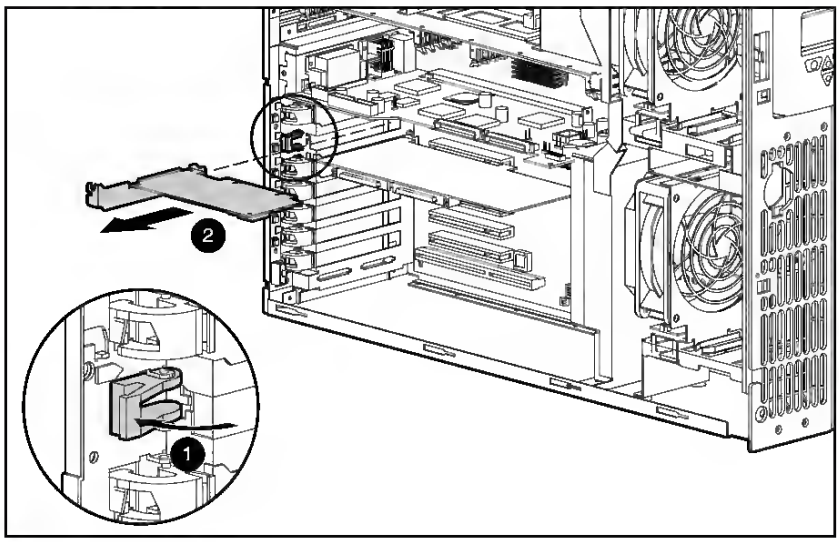

Figure 2-30. Removing the NIC

Reverse steps 1 through 5 to replace the NIC.

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Hot-Plug Power Supply LED Indicators

Compaq ProLiant 5500 and 5500R Servers ship with one 750-watt/220V (500-watt/110V) hot-plug power supply. Compaq ProLiant 5500 and 5500R Servers support a 750-watt redundant hot-plug power supply as an option.

CAUTION: In a single power supply configuration, the power supply must be installed in bay A, with a power supply cover plate over bay B to ensure proper cooling.

Each power supply has status and AC power indicators. See Figure 2-30 and Table 2-6 for descriptions of the power supply indicators.

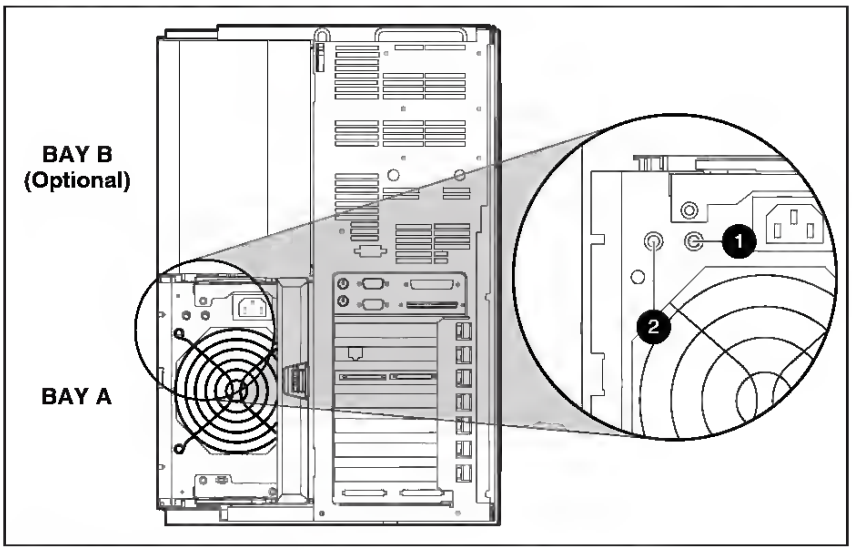

Figure 2-31. Hot-plug power supply indicators

Table 2-5
Hot-Plug Power Supply LED Indicators

Ref.	Indicator		LED Status	Description
	⚠	**Status**	Amber	Fault detected in this power supply Failed self-test
			Amber flashing	Power supply failed to restart after a prolonged fault Power supply will restart within 20 seconds No fault detected in this power supply
			Green/Amber Alternating	Interlock open
			Green flashing Green	No AC power connected
			OFF	DC power not switched on
	☼	**AC Power**	Green	AC power is connected to this power supply
			OFF	No AC power connected to this supply

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WARNING: To reduce the risk of electnc shock or damage to the equipment in a single power supply configuration:

- Unplug the power cord before removing the power supply from the server.
- Install the power supply before connecting the power cord to the power supply

NOTE: You do not need to place the system in Standby for a hot-plug power supply replacement in a redundant power supply configuration.

To remove a hot-plug power supply in a single power supply configuration:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Unplug the AC power cord.

IMPORTANT: Remove the two hot-plug power supply shipping screws (if installed).

3. Press the lever in the center of the hot-plug power supply handle , then pull out the handle . This detaches the power supply from the power backplane board.
4. Using the handle, pull the power supply from the server .

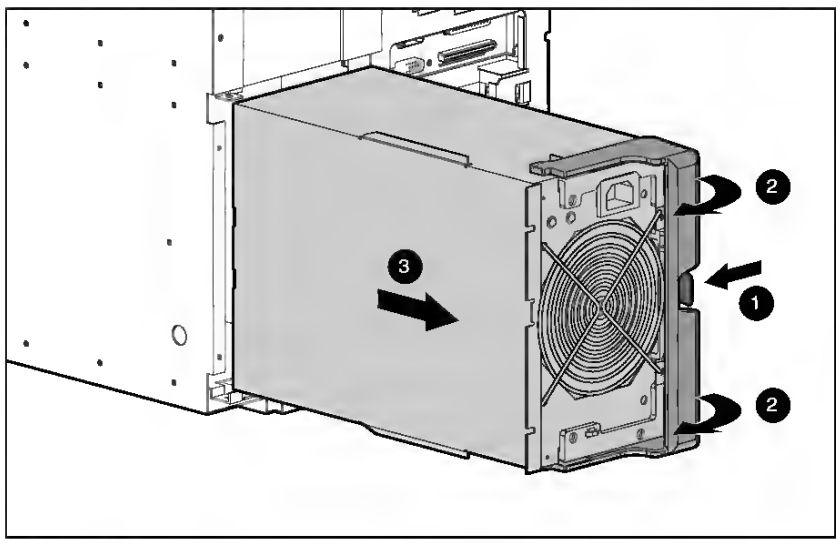

Figure 2-32. Removing a hot-plug power supply

Reverse steps 1 through 4 to replace a hot-plug power supply.

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Hot-Plug Power Supply Cover Plate

To remove the power supply cover plate:

1. Remove the two T-15 screws securing the power supply cover plate to the chassis.
2. Pull the hot-plug power supply cover plate away from the chassis.

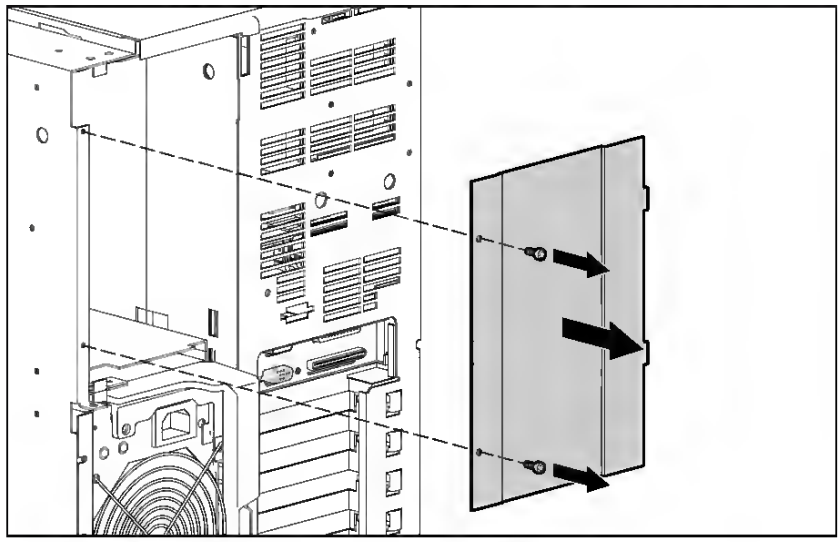

Figure 2-33. Removing the hot-plug power supply cover plate

Reverse steps 1 through 2 to replace a hot-plug power supply cover plate.

CAUTION: A power supply cover plate must be present in bays not containing power supplies to maintain proper cooling of the drive bays.

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Power Backplane Board

To remove the power backplane board:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the hot-plug power supply(s). See "Hot-Plug Power Supply LED Indicators" earlier in this chapter.
3. Disconnect all cables from the power backplane board.
4. Loosen tbe two thumbscrews securing tbe power backplane board.
5. Rotate the power backplane board , then slide it out the rear of the chassis through the power supply opening.

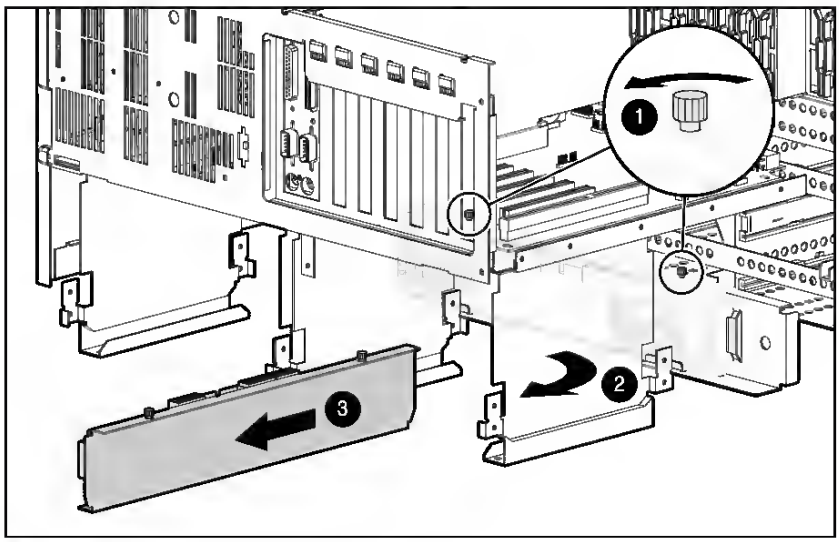

Figure 2-34. Removing the power backplane board

NOTE: Part of the chassis in Figure 2-34 was removed for clarity.

Reverse steps 1 through 5 to replace the power backplane board.

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System I/O Board with Tray

To remove the system I/O board with tray:

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in this chapter.
3. Remove the top access panel. See "Top Access Panel" earlier in this chapter.
4. Disconnect and remove all boards from the system I/O board. Place these boards on a nonconductive work surface for installation on the replacement system I/O board.
5. Disconnect all cables from the system I/O board.
6. Loosen the three thumbscrews securing tbe system I/O board and tray to the chassis.
7. Pull the system I/O board and tray througb the top of the server.

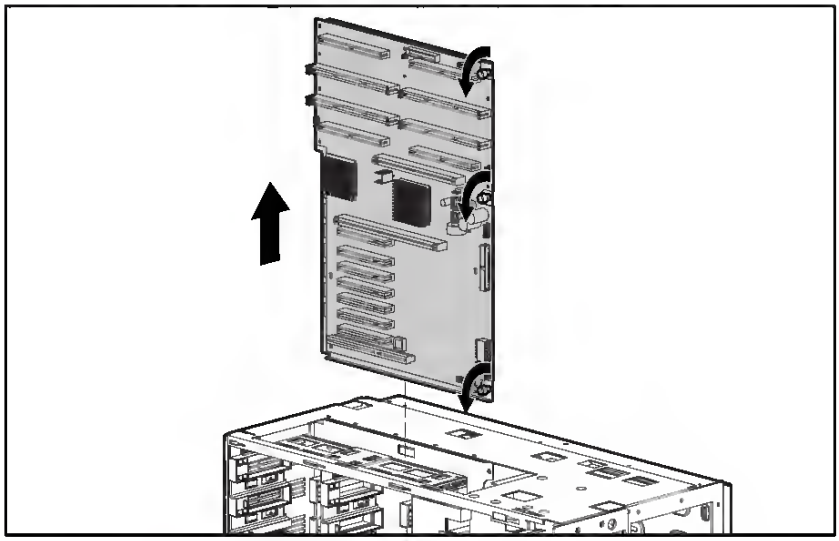

Figure 2-35. Removing the system I/O board with tray

8. Set the core frequency switch to matcb the processors currently in the server. See Table 4-4, Processor Core Frequency Switch Settings, for switch setting information.

To replace the system I/O board with tray:

1. Set the core frequency switcb.
2. Install the system I/O board.
3. Tighten the three thumbscrews that secure the system I/O board to the chassis.
4. Reconnect all cables to the system I/O board.
5. Reinstall the expansion boards.

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External Replacement Battery

To install the external replacement battery:

CAUTION: Do not remove the lithium battery from the peripheral board or permanent damage may occur. If the battery fails, use the external replacement battery.

1. Perform the preparation procedures. See "Preparation Procedures" earlier in this chapter.
2. Remove the side access panel. See "Side Access Panel" earlier in tbis cbapter.
3. Remove the jumper from location E3 on the peripheral board .
4. Connect the battery cable to tbe E6 battery header on the peripberal board .
5. Remove the adhesive backing from the hook-and-loop fastener strip. Place tbe battery and the hook-and-loop fastener strip as indicated in the following illustration .

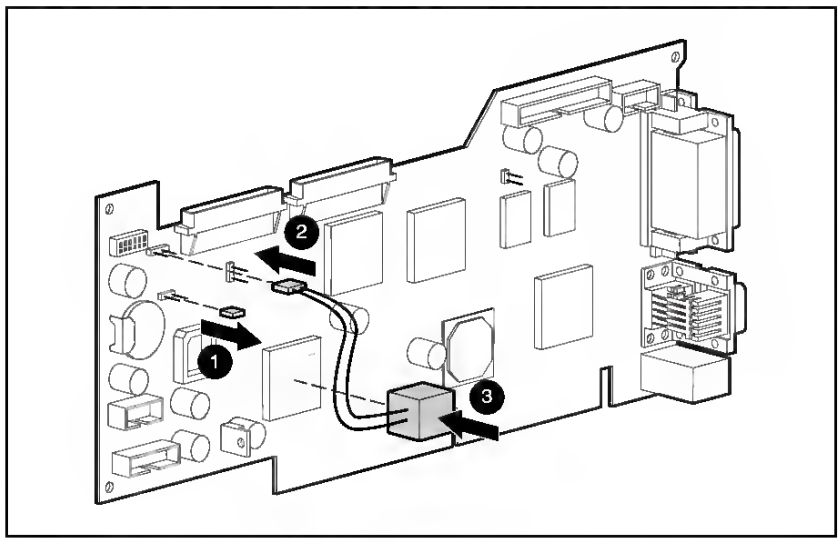

Figure 2-36. Installing the external replacement battery

6. Place the label included with your battery kit on the back of your server above the power connector.

WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Disconnect power from the server or other product by unplugging the power cord from either the electrical outlet or the server or other product.

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Chapter 3

Diagnostic Tools

This chapter describes software and firmware diagnostic tools available for all Compaq server products. The sections in this chapter are:

- Diagnostic Tools Utility Overview
- Default Configuration
- Utilities Access
- Power-On Self-Test (POST)
- Diagnostics Software
- Array Diagnostic Utility (ADU)
- Integrated Management Log
- Rapid Error Recovery
- Remote Service Features
- ROMPaq Error Recovery Options
- Compaq Insight Manager

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Diagnostic Tools Utility Overview

These utilities were developed to assist in diagnosing problems, testing the hardware, and monitoring and managing Compaq server hardware.

Table 3-1
Diagnostic Tools

Tool	What is it	How do I run it
Compaq Diagnostics Program	Utility to assist testing and/or verifying operation of Compaq hardware. If problems are found, Compaq Diagnostics isolates failure(s) down to replaceable part, whenever possible.	Diagnostics and Utilities are located on system partition on hard drive and must be accessed when a system configuration error is detected during Power-On Self-Test (POST). Compaq Diagnostics software is also available on Compaq SmartStart and Support Software CD. A Diagnostics diskette can be created from SmartStart and Support Software CD, and Diagnostics run from diskette.
Compaq Inspect Utility	The Inspect utility provides a report detailing system information.	The Inspect utility can be run from either the main menu of the *System Configuration* utility or the Compaq *Diagnostics* program.
Compaq Insight Manager	A client/server application used to remotely manage Compaq hardware in a network environment. Reports hardware fault conditions (both failure and pre-failure) and collects data for reporting and graphing.	For more information, refer to the *Compaq Management CD* and the *Compaq Insight Manager User Guide*. More information on viewing and printing the event list can be found in the Compaq Insight Manager section of this chapter.
Compaq Survey Utility	An online information gathering agent that runs on servers, gathering critical hardware and software information from various sources. A utility for servers running Windows NT or NetWare. If a significant change occurs between data gathering intervals, previous information is marked, and the *survey text file* is overwritten to reflect the latest configuration and changes since last configuration. This allows a historical record of change events for server hardware and software.	Install Survey from SmartStart, Compaq Integration Maintenance Utility, or from Compaq Management CD.

continued

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Table 3-1
Diagnostic Tools *continued*

Tool	What is it	How do I run it
Array Diagnostics Utility (ADU)	A Windows-based tool designed to run on all Compaq systems that support Compaq array controllers. Two main functions of ADU are to collect all possible information about the array controllers in the system, and generate a list of detected problems. This tool is available for all Compaq servers covered by this guide.	See the Array Diagnostics Utility (ADU) section later in this chapter.
Drive Array Advanced Diagnostics (DAAD)	The predecessor to ADU, DAAD is a DDS-based tool for Compaq servers with Smart Array Controllers. DAAD collects information about the array controllers in the system and offers a list of detected problems.	For a list of Compaq servers still supported by this tool, visit the Compaq website at http://www.compaq.com.
Integrated Management Log	A log of system events, such as system failures or non-fatal error conditions. You can view events in the Integrated Management Log ■ Dn the Integrated Management Display ■ From within Compaq Insight Manager ■ From within Compaq Survey Utility	The Integrated Management Log requires Compaq Dperating System-dependent dnvers. Refer to Compaq Support Software CD for instructions on installing the appropriate drivers.
System Configuration Utility	Utility to easily configure the hardware installed in or connected to the server. Specifically, it can: ■ Resolve resource conflicts in areas such as memory, port addresses, and interrupts (IRQs) ■ Configure PCI boards automatically ■ Provide switch and jumper settings ■ Manage installation of memory, processor upgrades, and mass storage devices such as hard drives, tape drives, and diskette drives ■ Store configuration information in nonvolatile memory ■ Assist in installation of an operating system ■ Assist in running diagnostic tools such as TEST and INSPECT	If the server has bootable CD-RDM drive, run Compaq System Configuration Utility directly from Support Software CD supplied with SMART Controller Dption Kit, or SmartStart and Support Software CD supplied with server. Use the CD supplied for latest version supporting SMART Controller. If the sever does not have a bootable CD-RDM drive, create diskettes with latest version of the System Configuration Utility from Support Software CD, or SmartStart and Support Software CD.

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Default Configuration

When the system is first powered on, the system ROM detects the unconfigured state of the hardware and provides default configuration settings for most devices. By providing this initialization, the system can run Diagnostics and other software applications before running the normal SmartStart and System Configuration programs.

Default Configuration Messages

IMPORTANT: If you chose to format and partition the boot drive before running SmartStart and the System Configuration programs, this may prohibit creating a System Partition and the off-line remote management features that it provides.

If you insert a System Configuration, Diagnostics, or SmartStart and Support Software CD into the CD-ROM drive prior to powering on the Server, the system ROM boots to that utility. If the system ROM does not detect one of those CDs, you will be prompted for the intended operating system. The system reboots if any operating system-dependent configurations have changed with the new operating system selection. If the selected operating system-dependent configurations are the same as the current configurations, the system boots normally. If you enter a wrong choice, on subsequent re-boots you may change the operating system.

Inspect Utility

The Inspect Utility provides configuration information such as the contents of the operating system startup files, the current memory configuration, the ROM version, and Integrated Management Log information. It operates with MS-DOS and in the MS-DOS emulation mode of MS OS/2.

Running the Inspect Utility

1. Turn the server off, then back on, and press **F10** when the cursor appears in the upper right corner of the screen.
2. At the main menu, select *Diagnostics and Utilities*.
3. Press **Enter**.
4. Select *Inspect Computer* and press **Enter**.

   If the Diagnostics diskette is installed on the hard drive, System Configuration prompts you to insert the Diagnostics diskette in drive A.

   If the Diagnostics diskette is not installed on the hard drive, System Configuration prompts you to insert the Diagnostics diskette in drive A.
5. Follow the instructions. The first time that the Inspect Utility displays, indicate that you want to run Inspect by selecting *Entire System* and pressing **Enter**.

Printing the Inspect Listing

Select *Print* on the Inspect screen to print a copy of the Inspect listing. Keep a copy of the listing with each server for later reference.

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Utilities Access

The Compaq SmartStart and Support Software CD contains the SmartStart program and many of the Compaq utilities needed to maintain the system, including:

- System Configuration Utility
- Array Configuration Utility
- Array Diagnostic Utility
- ROMPaq Firmware Upgrade Utilities
- Compaq Diagnostics

CAUTION: Do not select the Erase Utility when running the SmartStart and Support Software CD. This will result in data loss to the entire system.

Running Compaq Utilities

There are three ways to access Compaq Utilities:

- **Run the utilities on the system partition.**

  If the system was installed using SmartStart, the Compaq utilities will automatically be available on the system partition. The system partition could also have been created during a manual system installation.

  To run the utilities on the system partition, boot the system and press **F10** when you see "**Press F10 for system partition utilities.**" Then select the utilities from the menu.

  - The System Configuration Utility is available under the System Configuration menu.
  - The Array Configuration Utility is available under the System Configuration menu.
  - Compaq Diagnostics (Test and Inspect) are available under the Diagnostics and Utilities Menu.
  - The ROMPaq Firmware Upgrade Utility is available under the Diagnostics and Utilities menu.

- Run the utilities from diskette.

  - Run the utilities from their individual diskettes. If you have a utility diskette newer than the version on the SmartStart and Support Software CD, use that diskette.
  - Create a diskette version of the utility from the SmartStart and Support Software CD.

  To create diskette versions of the utilities from the CD:

  a. Boot the Compaq SmartStart and Support Software CD.

  b. From the Compaq System Utilities screen, select Create Support Software Disks ➔ Next.

  c. Select the diskette you would like to create from the list, then follow the instructions on the screen.

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- Run the utilities from the Compaq SmartStart and Support Software CD.

IMPORTANT: Only the System Configuration Utility and the Array Configuration Utility and the Array Diagnostic Utility can be executed from the Compaq SmartStart and Support Software CD. All other utilities must be executed from the system partition or from diskette.

To run these utilities directly from the Compaq SmartStart and Support Software CD:

a. Boot the Compaq SmartStart and Support Software CD.

b. From the Compaq System Utilities screen, select the utility you wish to run, then select *Next*.

   ✎To execute the System Configuration Utility, select *Run System Configuration Utility*.

   ✎To execute the Array Configuration Utility, select *Run Array Configuration Utility*.

   ✎To execute the Array Diagnostic Utility, select Run Array Diagnostic Utility.

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Power-On Self-Test (POST)

POST is a series of diagnostic tests that run automatically on Compaq computers when the system is turned on. POST checks the following assemblies to ensure that the computer system is functioning properly:

- System ROM
- Keyboard
- Power supply
- System board
- Memory
- Memory expansion boards
- Controllers
- Diskette drives
- Hard drives
- Processor power modules
- Fans

POST Error Messages

If POST finds an error in the system, an error condition is indicated by an audible and/or visual message. If an error code displays on the screen during POST or after resetting the system, use the instructions in the POST Error Messages table. The error messages and codes listed include all codes generated by Compaq products. The system generates only those codes that are applicable to the configuration and options.

> **NOTE:** Many of the actions listed require you to run Diagnostics or the Compaq System Configuration Utility. Steps for running these utilities are provided in this chapter following the POST Error Messages tables.

In each case, the Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics program to verify whether the error condition has been corrected. If the error code reappears, perform the next step, then run the Diagnostics program again. Follow this procedure until Diagnostics no longer detects an error condition.

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Table 3-2
POST Error Messages

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
A Critical Error occurred prior to this power-up	None	A catastrophic system error, which caused the server to crash, has been logged.	Run Diagnostics. Replace failed assembly as indicated.
Unsupported Processor Detected System Halted	1L, 1S	Processor not supported by current system ROM.	Check documentation for supported processors, and if supported, remove the processor and update the system to latest ROM.
FATAL ROM ERROR: The System ROM is not properly programmed	1L, 1S	ROM programmed in factory incorrectly.	Replace the physical ROM part.
101-ROM Error	1L,1S	System ROM checksum.	Run Diagnostics. Replace failed assembly as indicated.
101-I/O ROM Error	None	Options ROM checksum.	Run Diagnostics. Replace failed assembly as indicated.
102-System Board Failure	None	DMA, timers, and so on.	Replace the system board. Run the Compaq System Configuration Utility.
104-ASR-2 Timer Failure	None	System board failure.	Run Diagnostics. Replace failed assembly as indicated.
105-Current System ROM is corrupt – now booting redundant System ROM	2L	Non-booted ROM image is corrupt.	Flash the ROM utilizing ROMPaq.
162-System Options Not Set	2S	Configuration incorrect.	Run the System Configuration Utility and correct.
163-Time & Date Not Set	2S	Invalid time or date in configuration memory.	Run the System Configuration Utility and correct.
164-Memory Size Error	2S	Configuration memory incorrect.	Run the System Configuration Utility and correct.
172-Configuration Nonvolatile Memory Invalid	None	Nonvolatile configuration corrupt or jumper installed.	Run the System Configuration Utility and correct.
173-Slot IO Mismatch	None	Board replaced, configuration not updated.	Run the System Configuration Utility and correct.
174-Configuration/Slot Mismatch Device Not Found	None	EISA or PCI board not found.	Run the System Configuration Utility and correct.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
175-Configuration/Slot Mismatch Device Found	None	EISA or PCI board added, configuration not updated.	Run the System Configuration Utility and correct.
177-Configuration Not Complete	None	Incomplete System Configuration.	Run the System Configuration Utility and correct.
178-Processor Configuration Invalid	None	Processor type or step does not match configuration memory.	Run the System Configuration Utility and correct.
180-Log Reinitialized	None	N/A	N/A
201-Memory Error	None	RAM failure.	Run Diagnostics. Replace failed assembly as indicated.
203-Memory Address Error	None	RAM failure.	Run Diagnostics. Replace failed assembly as indicated.
207-Invalid Memory Configuration - Check DIMM [SIMM] Installation	None	Memory module installed incorrectly.	Verify placement of memory modules.
208-Invalid Memory Speed - Check DIMM [SIMM] Installation	1L, 1S	The speed of the memory is too slow, where: xx00 = expansion board SIMMs are too slow, or 00yy = system board SIMMs are too slow. xx and yy have corresponding bit set.	The speed of the memory modules must be 60 ns. Verify the speed of the memory modules installed and replace.
209-Memory Detection Failure. Check Memory Installation	1L, 1S	Unable to size memory.	Check DIMM installation. If error persists, replace DIMM.
211-Cache Switch Set Incorrectly	None	Switch not set properly during installation or upgrade.	Verify switch settings.
212-System Processor Failed/Mapped out	1S	Processor in slot x failed	Run Diagnostics and replace failed processor.
214-DC-DC Converter Failed	None	PowerSafe Module (DC-DC Converter) failed.	Run Diagnostics. Replace failed assembly as indicated.
214-Processor PPM Failed Module X	None	Indicated PPM (DC-DC Converter) failed.	Replace failed assembly as indicated.
215-Processor Power Module has lost Redundancy in Socket x	None	PPM (DC-DC Converter) has lost redundancy.	Run Diagnostics. Replace failed assembly as indicated.
215-Nonfunctioning Voltage Regulator Module for Processors	None	PPM (DC-DC Converter) has failed or lost redundancy.	Run Diagnostics. Replace failed assembly as indicated.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
216-Voltage Regulator Module for Processor X no longer redundant	None	Redundancy failed in PPM.	To restore redundancy, replace the PPM.
216-Processor PPM has lost Redundancy, Module X	None	Indicated PPM (DC-DC Converter) has lost redundancy.	Replace failed assembly as indicated.
219-Tag Update Rules SRAM Failure. System Halted	None	Catastrophic chipset failure.	Call Compaq Service provider.
219-Snoop Rules SRAM Failure. System Halted.	None	Catastrophic chipset failure.	Call Compaq Service provider.
221-Power Fault Dn Processor Bus X	None	A PPM on indicated bus is in a failed state.	Run Diagnostics. Replace failed assembly as indicated.
301-Keyboard Error	None	Keyboard failure.	Turn off the computer, then reconnect the keyboard.
301-Keyboard Error or Test Fixture Installed	None	Keyboard failure.	Replace the keyboard.
ZZ-301-Keyboard Error	None	Keyboard failure. (*ZZ* represents the Keyboard Scan Code.)	1. A key is stuck. Try to free it. 2. Replace the keyboard.
303-Keyboard Controller Error	None	System board, keyboard, or mouse controller failure.	1. Run Diagnostics. 2. Replace failed assembly as indicated.
304-Keyboard or System Unit Error	None	Keyboard, keyboard cable, or system board failure.	1. Make sure the keyboard is attached. 2. Run Diagnostics to determine which component is in error. 3. Replace the part indicated.
40X-Parallel Port X Address Assignment Conflict	2S	Both external and internal ports are assigned to parallel port X.	Run the System Configuration Utility and correct.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
601-Diskette Controller Error	None	Diskette controller circuitry failure.	1. Make sure the diskette drive cables are attached. 2. Replace the diskette drive and/or cable. 3. Replace the system board.
605-Diskette Drive Type Error	2S	Mismatch in drive type.	Run the System Configuration Utility to set diskette type correctly.
1151-Com Port 1 Address Assignment Conflict	2S	Both external and internal serial ports are assigned to COM1.	Run the System Configuration Utility and correct.
1152-Com Port 2, 3, or 4 Address Assignment Conflict	2S	Both external and internal serial ports are assigned to COM2, COM3, or COM4.	Run the System Configuration Utility and correct.
1610-Temperature violation detected. Waiting for system to cool	2S	Ambient system temperature too hot.	Check fan in system environment.
1611-Fan failure detected	2S	Required fan either not installed or not spinning.	Check fans.
1611-I/O Fan (Fan X) failure detected	2S	I/O fan has failed.	Replace the failed fan.
1611-CPU Fan (Fan X) failure detected	2S	CPU fan has failed.	Replace the failed fan.
1612-Primary power supply failure	2S	Primary power supply has failed.	Replace power supply as soon as possible.
1613-Low System Battery	None	Real-time clock system battery is running low on power.	Run Diagnostics. Replace failed assembly as indicated.
1615-Power Supply Failure, Power Supply Unplugged, or Power Supply Fan Failure in Bay X	None	A power supply has failed.	Replace or check specified power supply.
1617-Fan controller not responding	2S	Fan controller failure.	Check and replace failed controller assembly.
1617-I/O Fan controller not responding	2S	I/O Fan controller failure.	Check and replace failed controller assembly.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1618-PCI slots powered down. Check PCI hot plug enabler connectors.	None	PCI hot plug enabler is missing or failed.	Check and replace missing or failed assembly.
1620-Locked SCSI Bus Detected. Verify SCSI bus cabling. System halted.	None	SCSI bus failure.	Run Diagnostics. Replace failed assembly as indicated.
1621-Current SCSI bus cable configuration is not recommended	None	Improper SCSI bus cabling.	Check documentation for proper SCSI bus cabling
1703-SCSI cable error detected. Internal SCSI cable not attached to system board connector. System halted.	None	Incorrect cabling.	Ensure that the integrated SCSI controller has SCSI termination attached.
1720-Slot x Drive Array – SMART Drive Detects Imminent Failure SCSI: Port y: SCSI ID x	None	Pre-failure condition.	Indicated drive has reported a SMART predictive-failure condition and may fail at some time in the future. If drive is part of a non-fault-tolerant configuration, back up all data before replacing drive and restore all data afterwards. If drive is part of a fault-tolerant configuration, **do not** replace drive unless all other drives in array are on-line. Press **F1** to resume.
1724-Slot x Drive Array – Physical Drive Position Change(s) Detected – Logical drive configuration has automatically been updated	None	Drive change	Indicates that logical drive configuration has been updated automatically following physical drive position changes. Press **F1** to resume.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1726-Slot x Drive Array – Array Accelerator Memory Size Change Detected	None	Configuration update.	Indicates array accelerator configuration has been updated automatically due to replacement of Array Accelerator (or controller) with one having different memory size. Press **F1** to resume.
1727-Slot x Drive Array – New Logical Drive(s) Attachment Detected. If more than 32 logical drives, this message will be followed by: Auto-configuration failed: Too many logical drives.	None	Additional drives.	This message indicates that the controller has detected an additional array of drives that was attached when the power was off. The logical drive configuration information has been updated to add the new logical drives. The maximum number of logical drives supported is 32. Additional logical drives will not be added to the configuration. Press **F1** to resume.
1730-Fixed Disk 0 does not support DMA Mode.	None	Hard drive error.	Run the System Configuration Utility and correct.
1731-Fixed Disk 1 does not support DMA Mode.	None	Hard drive error.	Run the System Configuration Utility and correct.
1740-Fixed Disk 0 failed Set Block Mode command	None	Hard drive error.	Run the System Configuration Utility and correct.
1741-Fixed Disk 1 failed Set Block Mode command	None	Hard drive error.	Run the System Configuration Utility and correct.
1750-Fixed Disk 0 failed Identify command	None	Hard drive error.	Run the System Configuration Utility and correct.
1751-Fixed Disk 1 failed Identify command	None	Hard drive error.	Run the System Configuration Utility and correct.
1760-Fixed Disk 0 does not support Block Mode	None	Hard drive error.	Run the System Configuration Utility and correct.
1761-Fixed Disk 1 does not support Block Mode	None	Hard drive error.	Run the System Configuration Utility and correct.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1764-Slot x Drive Array - Capacity Expansion Process is temporarily disabled (followed by one of the following): ■ Expansion will resume when Array Accelerator has been reattached. ■ Expansion will resume when Array Accelerator has been replaced. ■ Expansion will resume when Array Accelerator RAM allocation is successful. ■ Expansion will resume when Array Accelerator battery reaches full charge. ■ Expansion will resume when automatic data recovery has been completed			Reattach or replace Array Accelerator, wait until the Array Accelerator batteries have charged, or for Automatic Data Recovery to complete, as indicated.
1765-Slot x Drive Array Dption RDM Appears to Conflict With an ISA Card ISA cards with 16-bit memory cannot be configured in memory range C0000 to DFFFF along with the SMART-2/E 8-bit Dption RDM due to EISA bus limitations Please remove or reconfigure your ISA card.			Remove or reconfigure conflicting ISA cards. Disable "shared memory" on any ISA network cards that may be installed.
1766-Slot x Drive Array requires System RDM Upgrade Run Systems RDMPaq Utility.			Run the latest Systems RDMPaq Utility to upgrade your System RDMs.
1767-Slot x Drive Array Dption RDM is Not Programmed Correctly or may Conflict with the Memory Address Range of an ISA Card. Check the Memory Address Configuration of installed ISA Card(s) or run Dptions RDMPaq Utility to attempt SMART-2/E Dption RDM Reprogramming.			Remove or reconfigure conflicting ISA cards, especially any cards that are not recognized by the System Configuration Utility. Try reprogramming the RDM on the SMART-2/E Controller using the latest Dptions RDMPaq (version 2.29 or higher).
1768-Slot x Drive Array -Resuming logical drive expansion process.	None	SMART-2 Controller error.	No action required. Appears whenever a controller reset or power cycle occurs while array expansion is in progress
1769-Slot x Drive Array - Drive(s) disabled due to failure during expand. Select **F1** to continue with logical drives disabled. Select **F2** to accept data loss and to re-enable logical drives.	None	SMART-2 Controller error.	Data has been lost while expanding the array, therefore the drives have been temporarily disabled. Press **F2** to accept the data loss and re-enable the logical drives. Restore data from backup.
1771-Primary Disk Port Address Assignment Conflict	None	Internal and external hard drive controllers are both assigned to the primary address.	Run the System Configuration Utility and correct.
1772-Secondary Disk Port Address Assignment Conflict	None	Address Assignment Conflict. Internal and external hard drive controllers are both assigned to the secondary address.	Run the System Configuration Utility and correct.

continued

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1773-Primary Fixed Disk Port Assignment Conflict	None	Fixed disk drive error.	Run the System Configuration Utility and correct.
1774-Slot x Drive Array - Obsolete data found in Array Accelerator. Select **F1** to discard contents of Array Accelerator. Select **F2** to write contents of Array Accelerator to drives.	None	SMART-2 Controller error.	Data found in Array Accelerator is older than data found on drives. Press **F1** to discard the older data in the Array Accelerator and retain the newer data on the drives.
1775-Slot x Drive Array – ProLiant Storage System Not Responding SCSI Port (y): Check storage system power switch and cables. Turn the system power off while checking the ProLiant power and cable connections, then turn the system power back on to retry.	None	Storage system problem.	Turn off power to system. Check external ProLiant power switch – external drives must all be powered up before or at the same time as the main system. Check cables. If retry does not help, try replacing the cable, ProLiant firmware, ProLiant backplane, or the Smart Array Controller.
1776-Drive Array - SCSI Port Termination Error	None	External and internal SCSI drives are both configured to Port 1.	Reconfigure drives.
1777-Drive Array External Drive Subsystem Error	None	Cooling fan failure, internal temperature alert or open side panel.	Inspect for cooling fan failure or open side panel.
1778-Drive Array resuming Automatic Data Recovery process	None	This message appears whenever a controller reset or power cycle occurs while Automatic Data Recovery is in progress.	No action necessary.
1779-Drive Array Controller detects replacement drives	None	Intermittent drive failure and/or possible loss of data.	If this message appears and drive X has not been replaced, this indicates an intermittent drive failure. This message also appears once immediately following drive replacement whenever data must be restored from backup.
1780-Disk 0 Failure	None	Hard drive/format error.	Run Diagnostics. Replace failed assembly as indicated.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1781-Disk 1 Failure	None	Hard drive/format error.	Run Diagnostics. Replace failed assembly as indicated.
1782-Disk Controller Failure	None	Hard disk drive circuitry error.	Run Diagnostics. Replace failed assembly as indicated.
1783-Slot x Drive Array Controller Failure	None	RDM installation problem or Array Accelerator board problem.	If this message appears immediately following a RDM installation, the RDM is defective or not installed properly. Check to see if the Array Accelerator board is attached properly. Check that the array controller is firmly inserted in its slot. Try upgrading the System RDMs. Otherwise, replace the Smart Array Controller.
1784-Drive Array Drive Failure, Physical Drive	None	Defective drive and/or cables.	Check for loose cables. Replace defective drive *X* and/or cable(s).
1785-Drive Array not Configured	None	Configuration error.	
Run Compaq Array Configuration Utility			1. Run the Compaq Array Configuration Utility.
No drives detected.			2. Turn off system and check SCSI cable connections to make sure drives are attached properly.
Array Accelerator Memory Size Increased.			3. Run the Compaq System Configuration Utility.
External Cable(s) Attached to Wrong SCSI Port Connector(s).			4. Turn system power OFF and swap SCSI power connectors to prevent data loss.
Drive positions cannot be changed during Capacity Expansion.			5. Run Array Diagnostic Utility if previous positions are unknown. Then turn system power OFF and move drives to their original positions.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1785- *continued*			
Drive positions appear to have changed.			6. Run Array Diagnostic Utility if previous positions are unknown. Then turn system power DFF and move drives to their original positions.
Configuration information indicates drive positions beyond the capability of this controller. This may be due to drive movement from a controller that supports more drives than the current controller.			7. To avoid data loss turn system power DFF and reattach drives to the original controller.
Configuration information indicates drives were configured on a controller with a newer firmware version.			8. To avoid data loss, reattach drives to original controller or upgrade controller firmware to the version of the original controller using Dption RDMPaq. Press **F1** to resume.
1786-Drive Array Recovery Needed The following drive(s) need Automatic Data Recovery: Drive *X*. Select "**F1**" to continue with recovery of data to drive(s). Select "**F2**" to continue without recovery of data to drive(s).	None	Interim Data Recovery mode. Data has not been recovered yet.	Press **F1** to allow Automatic Data Recovery to begin. Data will automatically be restored to drive *X* now that the drive has been replaced or now seems to be working. -Dr- Press **F2** and the system will continue to operate in the Interim Data Recovery mode.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1787-Drive Array Dperating in Interim Recovery Mode. Physical drive replacement needed: Drive *X*	None	Hard drive *X* failed or cable is loose or defective. Following a system restart, this message reminds you that drive *X* is defective and fault tolerance is being used.	1. Replace drive X as soon as possible. 2. Check loose cables. 3. Replace defective cables.
*1788-Incorrect Drive Replaced: Drive *X* Drive(s) were incorrectly replaced Drive *Y* Select "F1" to continue - drive array will remain disabled. Select "F2" to reset configuration - all data will be lost.	None	Drives are not installed in their original positions, so the drives have been disabled. See note below.	Reinstall the drives correctly as indicated. Press **F1** to restart the computer with the drive array disabled. -Dr- Press **F2** to use the drives as configured and lose all the data on them.
***NOTE:** The 1788 error message might display inadvertently due to a bad power cable connection to the drive or by noise on the data cable. If this message was due to a bad power cable connection, but not because of an incorrect drive replacement, repair the connection and press **F2**. -Dr- If this message was not due to a bad power cable connection, and no drive replacement took place, this could indicate noise on the data cable. Check cable for proper routing.			
1789-Drive Not Responding, Physical Drive Check cables or replace physical drive *X*. Select "F1" to continue - drive array will remain disabled. Select "F2" to fail drive(s) that are not responding - Interim Recovery Mode will be enabled if configured for fault tolerance.	None	Cable or hard drive failure.	1. Check the cable connections. 2. Replace the cables. 3. Replace the drive. If you do not want to replace the drive now, press **F2**.
1790-Disk 0 Configuration Error	None	Hard drive error or wrong drive type.	Run the System Configuration Utility and Diagnostics and correct.
1791-Disk 1 Error	None	Hard drive error or wrong drive type.	Run the System Configuration Utility and Diagnostics and correct.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1792-Drive Array Reports Valid Data Found in Array Accelerator. Data will automatically be written to drive array.	None	This indicates that while the system was in use, power was interrupted while data was in the Array Accelerator memory. Power was then restored within eight to ten days, and the data in the Array Accelerator was flushed to the drive array.	No action necessary; no data has been lost. Perform orderly system shutdowns to avoid data remaining in the Array Accelerator.
1793-Drive Array - Array Accelerator Battery Depleted - Data Lost (Error message 1794 also displays.)	None	This indicates that while the system was in use, power was interrupted while data was in the Array Accelerator memory. Array Accelerator batteries failed. Data in Array Accelerator has been lost.	Power was not restored within eight to ten days. Perform orderly system shutdowns to avoid data remaining in the Array Accelerator.
1794-Drive Array - Array Accelerator Battery Charge Low. Array Accelerator is temporarily disabled. Array Accelerator will be re-enabled when battery reaches full charge.	None	This is a warning that the battery charge is below 75%. Posted-writes are disabled.	Replace the Array Accelerator board if batteries do not recharge within 36 power-on hours.
1795-Drive Array - Array Accelerator Configuration Error. Data does not correspond to this drive array. Array Accelerator is temporarily disabled.	None	This indicates that while the system was in use, power was interrupted while data was in the Array Accelerator memory. The data stored in the Array Accelerator does not correspond to this drive array.	Match the Array Accelerator to the correct drive array, or run the System Configuration Utility to clear the data in the Array Accelerator.
1796-Drive Array - Array Accelerator Not Responding. Array Accelerator is temporarily disabled.	None	Array Accelerator is defective or has been removed.	1. Check that the Array Accelerator is properly seated. 2. Run the System Configuration Utility to reconfigure the Compaq IDA-2 without the Array Accelerator.
1797-Drive Array - Array Accelerator Read Error Occurred. Data in Array Accelerator has been lost. Array Accelerator is disabled.	None	Hard parity error while reading data from posted-writes memory.	Enable Array Accelerator.

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Table 3-2
POST Error Messages *continued*

Error Code	Audible Beeps L=Long S=Short	Probable Source of Problem	Recommended Action
1798-Drive Array - Array Accelerator Write Error Occurred. Array Accelerator is disabled.	None	Hard parity error while writing data to posted-writes memory.	Enable Array Accelerator.
1799-Drive Array - Drive(s) Disabled due to Array Accelerator Data Loss. Select "F1" to continue with logical drives disabled. Select "F2" to accept data loss and to re-enable logical drives.	None	Volume failed due to loss of data in posted-writes memory.	Press **F1** to continue with logical drives disabled or **F2** to accept data loss and re-enable logical drive.
Beeps only: 2 Long	2L	No valid memory is present in the system.	Replace failed memory with valid memory.
Beeps only: 2 Long + 2 Short	2L, 2S	Power is cycled. Temperature too hot. Processor fan either not installed or not spinning.	Check fans.
(Run System Configuration Utility - **F10** key)	None	A configuration error occurred during POST.	Press **F10** to run System Configuration Utility.
(RESUME - **F1** key)	None	As indicated to continue.	Press **F1**

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Diagnostics Software

Test Error Codes Tables include all test error codes generated by Compaq products. Each code has a corresponding description and recommended action(s). The system generates only those codes that are applicable to the configuration and options.

When you select Diagnostics and Utilities from the System Configuration Utility main menu, the utility prompts you to test, inspect, upgrade, and diagnose the server.

Diagnostics and Utilities are located on the system partition on the hard drive and must be accessed when a system configuration error is detected during the Power-On Self-Test (POST). Compaq Diagnostics software is also available on the Compaq SmartStart and Support Software CD. You can create a Diagnostics diskette from the SmartStart and Support Software CD and run Diagnostics from diskette.

The following options are available from the Diagnostics and Utilities menu:

- Test Computer
- Inspect Computer
- Upgrade Firmware
- Remote Utilities
- Diagnose Drive Array

Diagnostic error codes are generated when the Diagnostics software recognizes a problem. These error codes help identify possible defective subassemblies.

Steps for Diagnostics

In each case, the Recommended Action column lists the steps necessary to correct the problem. After completing each step, run the Diagnostics utility to verify that the error condition has been corrected. If the error code reappears:

1. Perform the next step listed in the table.
2. Run the Diagnostics program again.
3. Follow this procedure until the Diagnostics program no longer detects an error condition.

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100 – 199, Primary Processor Test Error Codes

The 100 series of diagnostic error codes identifies failures with processor and system board functions.

Table 3-3
Primary Processor Test Error Codes

Error Code	Description	Recommended Action
101-xx	CPU test failed	Replace the processor board and retest.
103-xx	DMA page registers test failed.	Replace the processor board and retest.
104-xx	Interrupt controller master test failed.	
105-xx	Port 61 error.	
106-xx	Keyboard controller self-test failed.	
107-xx	CMOS RAM test failed.	1. Replace the battery/clock module and retest.
108-xx	CMOS interrupt test failed	2. Replace the system board and retest.
109-xx	CMOS clock load data test failed.	
110-xx	Programmable timer load data test failed.	Replace the processor board and retest.
111-xx	Refresh detect test failed.	
112-xx	Speed test slow mode out of range.	
113-xx	Protected mode test failed.	
114-xx	Speaker test failed.	1. Verify the speaker connection and retest. 2. Replace the speaker and retest. 3. Replace the system board and retest.
116-xx	Cache test failed	Replace the system board and retest.
122-xx	Multiprocessor Dispatch test failed.	1. Check the system configuration and retest. 2. Replace the processor board and retest. 3. Replace the system board and retest.
123-xx	Interprocessor Communication test failed.	
199-xx	Installed devices test failed.	1. Check the system configuration and retest. 2. Verify cable connections and retest. 3. Check switch and/or jumper settings and retest. 4. Run the Configuration utility and retest. 5. Replace the processor board and retest. 6. Replace the system board and retest.

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200 – 299, Memory Test Error Codes

The 200 series of diagnostic error codes identifies failures with the memory subsystem.

Table 3-4
Memory Test Error Codes

Error Code	Description	Recommended Action
200-xx	Invalid memory configuration.	Reinsert memory modules in correct location and retest.
201-xx 202-xx	Memory machine ID test failed. Memory system ROM checksum failed.	1. Replace the system ROM and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
203-xx 204-xx 205-xx 206-xx	Memory write/read test failed. Memory address test failed. Walking I/O test failed. Increment pattern test failed.	1. Replace the memory module and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
207-xx	Invalid memory configuration-check DIMM installation. DIMMs installed have 8K refresh.	Replace DIMMs.
208-xx	Invalid memory speed detected - check DIMM installation. Slow DIMMs may cause data loss.	Replace DIMMs with timing greater than 60 ns.
210-xx	Random pattern test failed.	1. Replace the memory module and retest. 2. Replace the processor board and retest. 3. Replace the memory expansion board and retest.
215	Non-functioning DC-DC converter for processor X.	Replace the DC-DC converter(processor power module).

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300 – 399, Keyboard Test Error Codes

The 300 series of Diagnostic error codes identifies failures with keyboard and system board functions.

Table 3-5
Keyboard Test Error Codes

Error Code	Description	Recommended Action
301-xx	Keyboard short test, 8042 self-test failed.	1. Check the keyboard connection. If disconnected, turn off the computer and connect the keyboard and retest. 2. Replace the keyboard and retest. 3. Replace the system board and retest.
302-xx	Keyboard long test failed.	
303-xx	Keyboard LED test, 8042 self-test failed.	
304-xx	Keyboard typematic test failed.	

400 – 499, Parallel Printer Test Error Codes

The 400 series of Diagnostic error codes identifies failures with parallel printer interface card or system board functions.

Table 3-6
Parallel Printer Test Error Codes

Error Code	Description	Recommended Action
401-xx	Printer failed or not connected.	1. Connect the printer and retest.
402-xx	Printer data register failed.	2. Check the power to the printer and retest.
403-xx	Printer pattern test failed.	3. Install the loopback connector and retest.
498-xx	Printer failed or not connected.	4. Check the switch on the Serial/Parallel Interface board (if applicable) and retest. 5. Replace the Serial/Parallel Interface board (if applicable) and retest. 6. Replace the system board and retest.

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500 – 599, Video Display Unit Test Error Codes

The 500 series of Diagnostic error codes identifies failures with video or system board functions.

Table 3-7
Video Display Unit Test Error Codes

Error Code	Description	Recommended Action
501-xx	Video controller test failed.	1. Replace the monitor and retest.
502-xx	Video memory test failed.	2. Replace the Advanced VGA board and retest.
503-xx	Video attribute test failed.	3. Replace the system board and retest.
504-xx	Video character set test failed.	
505-xx	Video 80 x 25-mode 9 x 14 character cell test failed.	
506-xx	Video 80 x 25-mode 8 x 8 character cell test failed.	
507-xx	Video 40 x 25-mode test failed.	
508-xx	Video 320 x 200-mode color set 0 test failed.	
509-xx	Video 320 x 200-mode color set 1 test failed.	
510-xx	Video 640 x 200-mode test failed.	
511-xx	Video screen memory page test failed.	
512-xx	Video gray scale test failed.	
514-xx	Video white screen test failed.	
516-xx	Video noise pattern test failed.	

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600 – 699, Diskette Drive Test Error Codes

The 600 series of Diagnostic error codes identifies failures with diskette, diskette drive, or system board functions.

Table 3-8
Diskette Drive Test Error Codes

Error Code	Description	Recommended Action
600-xx	Diskette ID drive types test failed.	1. Replace the diskette and retest. 2. Check and/or replace the diskette power and signal cables and retest. 3. Replace the diskette drive and retest. 4. Replace the system board and retest.
601-xx	Diskette format failed.	
602-xx	Diskette read test failed.	
603-xx	Diskette write/read/compute test failed.	
604-xx	Diskette random seek test failed.	
605-xx	Diskette ID media failed.	
606-xx	Diskette speed test failed.	
607-xx	Diskette wrap test failed.	
608-xx	Diskette write protect test failed.	
609-xx	Diskette reset controller test failed.	
610-xx	Diskette change line test failed.	
694-xx	Pin 34 is not cut on 360 KB diskette drive.	
697-xx	Diskette type error.	
698-xx	Diskette drive speed not within limits.	
699-xx	Diskette drive/media ID error.	1. Replace the media and retest. 2. Run the Configuration utility and retest.

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800 – 899, Monochrome Video Board Test Error Codes

The 800 series of Diagnostic error codes identifies failures with monochrome video boards or system board functions.

Table 3-9
Monochrome Video Board Test Error Codes

Error Code	Description	Recommended Action
802-xx	Video memory test failed.	1. Replace monitor and retest.
824-xx	Monochrome video text mode test failed.	2. Replace the Advanced VGA board and retest. 3. Replace monochrome board and retest. 4. Replace the system board and retest.

1100 – 1199, Serial Test Error Codes

The 1100 series of Diagnostic error codes identifies failures with serial/parallel interface board or system board functions.

Table 3-10
Serial Test Error Codes

Error Code	Description	Recommended Action
1101-xx	Serial port test failed.	1. Check the switch settings on the Serial/Parallel Interface board (if applicable) and retest.
1109-xx	Clock register test failed.	2. Replace the Serial/Parallel Interface board (if applicable) and retest. 3. Replace the system board and retest.

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1200 – 1299, Modem Communications Test Error Codes

The 1200 series of Diagnostic error codes identifies failures with the modem.

Table 3-11
Modem Communications Test Error Codes

Error Code	Description	Recommended Action
1201-xx	Modem internal loopback test failed.	1. Refer to the modem documentation for correct setup procedures and retest.
1202-xx	Modem time-out test failed.	2. Check the modem line and retest.
1203-xx	Modem external termination test failed.	3. Replace the modem and retest.
1204-xx	Modem auto originate test failed.	
1206-xx	Dial multi-frequency tone test failed.	
1210-xx	Modem direct connect test failed.	

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1700 – 1799, Hard Drive Test Error Codes

The 1700 series of Diagnostic error codes identifies failures with hard drives, hard drive controller boards, hard drive cabling, and system board functions. If the system uses a drive array controller, see the section for Array Diagnostic Utility (ADU).

Table 3-12
Hard Drive Test Error Codes

Error Code	Description	Recommended Action
1700-xx	Hard drive ID drive types test failed.	1. Run the System Configuration Utility and verify the drive type
1701-xx	Hard drive format test failed.	2. Replace the hard drive signal and power cables and retest.
1702-xx	Hard drive read test failed.	3. Replace the hard drive controller and retest.
1703-xx	Hard drive write/read/compare test failed.	4. Replace the hard drive and retest.
1704-xx	Hard drive random seek test failed.	5. Replace the system board and retest.
1705-xx	Hard drive controller test failed.	
1708-xx	Hard drive format bad track test failed.	
1709-xx	Hard drive reset controller test failed.	
1710-xx	Hard drive park head test failed.	
1715-xx	Hard drive head select test failed.	
1716-xx	Hard drive conditional format test failed.	
1717-xx	Hard drive ECC* test failed.	
1719-xx	Hard drive power mode test failed.	
1736-xx	Drive Monitoring failed.	
1799-xx	Invalid hard drive type failed.	

Note: * Error Checking and Correcting

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1900 – 1999, Tape Drive Test Error Codes

The 1900 series of Diagnostic error codes identifies failures with tape cartridges, tape drives, tape drive cabling, adapter boards, or the system board assembly.

Table 3-13
Tape Drive Test Error Codes

Error Code	Description	Recommended Action
1900-xx	Tape ID failed.	1. Replace the tape cartridge and retest.
1901-xx	Tape servo write failed.	2. Check and/or replace the signal cable and retest.
1902-xx	Tape format failed.	
1903-xx	Tape drive sensor test failed.	3. Check the switch settings on the adapter board (if applicable).
1904-xx	Tape BOT/EOT test failed.	4. Replace the tape adapter board (if applicable) and retest.
1905-xx	Tape read test failed.	
1906-xx	Tape write/read/compare test failed.	5. Replace the tape drive and retest.
		6. Replace the system board and retest.

2400 – 2499, Advanced VGA Board Test Error Codes

The 2400 series of Diagnostic error codes identifies failures with video boards, monitors, or the system board assembly.

Table 3-14
Advanced VGA Board Test Error Codes

Error Code	Description	Recommended Action
2402-xx	Video memory test failed.	1. Run the System Configuration Utility.
2403-xx	Video attribute test failed.	2. Replace the monitor and retest.
2404-xx	Video character set test failed.	
2405-xx	Video 80 x 25 mode 9 x 14 character cell test failed.	3. Replace the Advanced VGA board or other video board and retest.
2406-xx	Video 80 x 25 mode 8 x 8 character cell test failed.	4. Replace the system board and retest.
2407-xx	Video 40 x 25 mode test failed.	
2408-xx	Video 320 x 320 mode color set 0 test failed.	
2409-xx	Video 320 x 320 mode color set 1 test failed.	

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Table 3-14
Advanced VGA Board Test Error Codes *continued*

Error Code	Description	Recommended Action
2410-xx	Video 640 x 200 mode test failed.	1. Run the System Configuration Utility. 2. Replace the monitor and retest. 3. Replace the Advanced VGA board or other video board and retest. 4. Replace the system board and retest.
2411-xx	Video screen memory page test failed.	
2412-xx	Video gray scale test failed.	
2414-xx	Video white screen test failed.	
2416-xx	Video noise pattern test failed.	
2417-xx	Lightpen text mode test failed, no response.	
2418-xx	ECG/VGC memory test failed.	
2419-xx	ECG/VGC ROM checksum test failed.	
2420-xx	ECG/VGC attribute test failed.	
2421-xx	ECG/VGC 640 x 200 graphics mode test failed.	
2422-xx	ECG/VGC 640 x 350 16-color set test failed.	
2423-xx	ECG/VGC 640 x 350 64-color test failed.	
2424-xx	ECG/VGC monochrome text mode test failed.	
2425-xx	ECG/VGC monochrome graphics mode test failed.	
2431-xx	640 x 480 graphics test failure.	
2432-xx	320 x 200 graphics (256-color mode) test failure.	
2448-xx	Advanced VGA Controller test failed.	
2451-xx	132-column Advanced VGA test failed.	
2456-xx	Advanced VGA 256-Color test failed.	
2458-xx	Advanced VGA Bit BLT Test.	1. Run Setup. 2. Replace the system board and retest.
2468-xx	Advanced VGA DAC Test.	
2477-xx	Advanced VGA Data Path Test.	
2480-xx	Advanced VGA DAC Test.	

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6000 – 6099, Compaq Network Interface Controller Boards Test Error Codes

The 6000 series of Diagnostic error codes identifies failures with 32-bit DualSpeed NetFlex-2/Token Ring Controllers.

Table 3-15
Compaq Network Interface Boards
Test Error Codes

Error Code	Description	Recommended Action
6000-xx	Network card ID failed.	1. Check the controller installation in the EISA slot. 2. Check the interrupt type and number setting. 3. Check the media connection at the controller and Multistation Access Unit (MAU). 4. Check the media speed (4/16) and type Unshielded Twisted Pair/Shielded Twisted Pair (UTP/STP) settings. 5. Check the MAU, cabling, or other network components. 6. Replace the controller.
6001-xx	Network card setup failed.	
6002-xx	Network card transmit failed.	
6014-xx	Network card configuration failed.	
6016-xx	Network card reset failed.	
6028-xx	Network card internal failed.	
6029-xx	Network card external failed.	
6089-xx	Network card open failed.	
6090-xx	Network card initialization failed.	
6091-xx	Network card internal loopback failed.	
6092-xx	Network card external loopback failed.	

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6500 – 6599, SCSI Hard drive Test Error Codes

The 6500 series of diagnostic error codes identifies failures with SCSI hard drives, SCSI hard drive controller boards, SCSI hard drive cabling, and system board functions. If the system uses a drive array controller, see the section for Array Diagnostic Utility (ADU).

Table 3-16
SCSI Hard Drive Test Error Codes

Error Code	Description	Recommended Action
6500-xx	SCSI Disk ID drive types test failed.	1. Run the System Configuration Utility and verify the drive type.
6502-xx	SCSI Disk Unconditional Format test failed.	2. Run the System Configuration Utility and verify the drive type.
6505-xx	SCSI Disk Read Test Failed.	3. Replace the SCSI disk drive signal and power cables and retest.
6506-xx	SCSI Disk SA/Media test failed.	4. Replace the SCSI controller and retest.
6509-xx	SCSI Disk Erase tape test failed.	5. Replace the SCSI disk drive and retest.
6523-xx	SCSI Disk Random Read test failed.	6. Replace the system board and retest.
6528-xx	Media load/unload test failed.	

6600 – 6699, SCSI/IDE CD-ROM Drive Test Error Codes

The 6600 series of diagnostic error codes identifies failures with the CD-ROM cabling, CD-ROM drives, adapter boards, or the system board assembly.

Table 3-17
SCSI/IDE CD-ROM Drive Test Error Codes

Error Code	Description	Recommended Action
6600-xx	CD-ROM ID failed.	1. Replace the CD-ROM media and retest.
6605-xx	CD-ROM Read failed.	2. Check and/or replace the signal cable and retest.
		3. Check the switch settings on the adapter board (if applicable).
		4. Replace the SCSI controller (if applicable) and retest.
		5. Replace the CD-ROM drive and retest.
		6. Replace the system board and retest.

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6700 – 6799, SCSI Tape Drive Test Error Codes

The 6700 series of Diagnostic error codes identifies failures with tape cartridges, tape drives, media changers, tape drive cabling, adapter boards, or the system board assembly.

Table 3-18
SCSI Tape Drive Test Error Codes

Error Code	Description	Recommended Action
6700-xx	SCSI Tape ID drive types test failed.	1. Run the System Configuration Utility and verify the drive type.
6706-xx	SCSI Disk SA/Media test failed.	2. Replace the SCSI Tape drive signal and power cables and retest.
6709-xx	SCSI Disk Erase tape test failed.	3. Replace the SCSI controller and retest.
6728-xx	Media load/unload test failed.	4. Replace the SCSI Tape drive and retest.
		5. Replace the system board and retest.

7000 – 7099, Server Manager/R Board Test Error Codes

The 7000 series of Diagnostic error codes identifies failures with the Server Manager/R board.

Table 3-19
Server Manager/R 8oard Test Error Codes

Error Code	Description	Recommended Action
7000-11	Processor (80186 Timer).	Replace the Server Manager/R board and retest.
7000-12	Processor (80186 Registers).	
7000-13	Processor (Watch Dog Timer).	
7000-14	Processor (8570 RAM).	
7000-15	Processor (8570 RTC).	
7000-21	Memory.	
7000-22	Memory Write/Read.	
7000-23	Memory Address.	
7000-24	Memory Refresh Alert.	
7000-25	Memory Increment.	

continued

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Table 3-19
Server Manager/R Board Test Error Codes *continued*

Error Code	Description	Recommended Action
7000-26	Memory Random Data.	Replace the Server Manager/R board and retest.
7000-27	Memory Disturb Address.	
7000-28	Memory HBM	
7000-33	HBM IO.	
7000-34	HBM BMIC.	
7000-35	HBM Video.	
7000-41	ser_int.	
7000-42	ser_int.	
7000-43	ser_ext.	
7000-44	ser_ext.	
7000-45	ser_ext_int.	
7000-46	ser_ext_int.	
7000-51	mdm_int.	Replace the Server Manager/R board Enhanced 2400-Baud Integrated Modem and retest.
7000-52	mdm_int.	
7000-53	mdm_ext.	
7000-54	mdm_ext.	
7000-55	mdm_ext_int.	
7000-56	mdm_ext_int.	
7000-57	mdm\c\analog.	
7000-61	Voice/DTMF Internal Loopback	Replace the Server Manager/R board Voice ROM.
7000-62	Voice/DTMF Internal Loopback	
7000-78	Host ADC Measurements.	Replace the Server Manager/R board battery.
7000-79	Battery.	

8600 – 8699, Pointing Device Interface Test Error Codes

The 8600 Diagnostic error codes identifies failures with the pointing device (mouse, trackball, and so on) or the system board assembly.

Table 3-20
Pointing Device Interface Test Error Codes

Error Code	Description	Recommended Action
8601-xx	Pointing Device Interface test failed.	1. Replace with a working pointing device and retest. 2. Replace the system board and retest.

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Array Diagnostic Utility (ADU)

Array Diagnostic Utility (ADU) is a Windows-based software tool designed to run on all Compaq servers that support Compaq array controllers, and are running SmartStart 4.10 or later. The two main functions of ADU are to collect all possible information about array controllers in the system and to generate a list of detected problems. The error messages and codes listed include all codes generated by Compaq products. The system generates only codes applicable to the configuration and options in the server.

ADU works by issuing multiple commands to tbe array controllers to determine if a problem exists. This data can then be saved to a file. In severe situations, this file can be sent to Compaq for analysis. In most cases, ADU provides enough information to initiate problem resolution immediately.

NOTE: ADU does not write to the drives, destroy data, or change or remove configuration information.

Starting ADU

1. Insert the SmartStart CD into the CD-ROM drive.
2. Reboot the system from the SmartStart CD.
3. Select *Array Diagnostic Utility (ADU)* from the System Utilities menu.

   A "Please Wait" panel displays, indicating that ADU is identifying the system parameters.

   ADU gathers information from all of the array controllers in the system.

   The time it takes to gather this information depends on the size of the system.

   CAUTION: Do not cycle the power during this process. ADU must perform low-level operations that, if interrupted, could cause the controller to revert to a previous level of firmware if the firmware was soft-upgraded.

4. When the information gathering process is complete, ADU displays the main screen or a panel indicating any problems detected.
5. To generate an ADU report, select *File* then *Save Data* from the command menu.

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Table 3-21
ADU Diagnostic Messages

Message	Description	Recommended Action
Accelerator board not detected	Array controller did not detect a configured array accelerator board.	Install the array accelerator board on the array controller. If an array accelerator board is installed, check for proper seating on the array controller board.
Accelerator error log	List of the last 32 parity errors on transfers to or from memory on the array accelerator board. Displays starting memory address, transfer count, and operation (read and write).	If there are many parity errors, you may need to replace the array accelerator board.
Accelerator parity read errors: n	Number of times that read memory parity errors were detected during transfers from memory on array accelerator board.	If there are many parity errors, you may need to replace the array accelerator board.
Accelerator parity write errors: n	Number of times that write memory parity errors were detected during transfers to memory on the array accelerator board.	If there are many parity errors, you may need to replace the array accelerator board.
Accelerator status. Cache was automatically configured during last controller reset	This can occur when cache board is replaced with one of a different size.	Normal operations should continue.
Accelerator status. Data in the cache was lost due to some reason other than the battery being discharged	Data in the cache was lost, but not because of the battery being discharged.	Check to be sure that the array accelerator is properly seated. If the error continues, you may need to replace the array accelerator
Accelerator status. Dirty data detected has reached limit. Cache still enabled, but writes no longer being posted	The number of cache lines containing dirty data that cannot be flushed (written) to the drives has reached a preset limit. The cache is still enabled, but writes are no longer being posted. This problem usually occurs when there is a problem with the drive(s).	Resolve problem with drive(s). The controller will be able to write dirty data to drives and then posted write operations will be restored.
Accelerator status. Dirty data detected. Unable to write dirty data to drives	At least one cache line contains dirty data that the controller has been unable to flush (write) to the drives. This problem usually occurs when there is a problem with the drive(s).	Resolve the problem with drive(s), and then controller will then be able to write dirty data to drives.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Accelerator status: Excessive ECC errors detected in at least one cache line. As a result, at least on cache line is no longer in use	At least one line in the cache is no longer in use due to excessive ECC errors detected during use of the memory associated with that cache line.	Replacement of the cache should be considered. If cache replacement is not done, remaining cache lines should continue to operate properly.
Accelerator status: Obsolete data detected	During reset initialization obsolete data was found in cache. This was due to drives being moved and written to by another controller.	Normal operations should continue. The controller will either write data to drives or discard data completely.
Accelerator status: Obsolete data was discarded	During reset initialization obsolete data was found in cache and was discarded (not written to drives).	Normal operations should continue.
Accelerator status: Obsolete data was flushed (written) to drives	During reset initialization obsolete data was found in cache. Obsolete data was written to the drives, but newer data may have been overwritten.	If newer data was overwritten, you may need to restore newer data; otherwise, normal operations should continue.
Accelerator status: Permanently disabled	Array accelerator board has been permanently disabled. It remains disabled until it is reinitialized using the Array Configuration Utility (ACU).	Check the Disable Code field. Run Array Configuration Utility (ACU) to reinitialize the array accelerator board.
Accelerator status: Possible data loss in cache	Possible data loss detected during power-up due to all batteries being below sufficient voltage level and no presence of identification signatures on the array accelerator board.	There is no way to determine if dirty or bad data was in the cache and is now lost.
Accelerator status: Temporarily disabled	Array accelerator board has been temporarily disabled.	Check the Disable Code field.
Accelerator status: Unrecognized status	A status returned from the array accelerator board that ADU does not recognize.	Obtain the latest version of ADU.
Accelerator status: Valid data found at reset	Valid data was found in posted write memory at reinitialization. Data will be flushed to disk.	Not an error or data loss condition. No action needs to be taken.
Accelerator status: Warranty alert	Catastrophic problem with array accelerator board. Refer to other messages on Diagnostics screen for exact meaning of this message.	Replace the array accelerator board.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Adapter/NVRAM ID mismatch	EISA nonvolatile RAM has an ID for a different controller from the one physically present in the slot.	Run the System Configuration Utility.
Array accelerator battery pack X not fully charged	Battery is not fully charged.	If 75% of batteries present are fully charged, array accelerator is fully operational. If less than 75% of batteries are fully charged, allow 36 hours to recharge them.
Array accelerator battery pack X below reference voltage (recharging)	Battery pack on array accelerator is below required voltage levels.	Allow enough time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.
Board in use by expand operation	Array accelerator memory is in use by Expand operation.	Operate system without array accelerator board until expand operation completes.
Board not attached	Array controller configured for use with array accelerator board, but one is not attached.	Attach array accelerator board to array controller.
Configuration signature is zero	ADU detected that nonvolatile RAM contains a configuration signature that is zero. Old versions of the System Configuration Utility could cause this.	Run the latest version of System Configuration Utility to configure the controller and nonvolatile RAM.
Configuration signature mismatch	Array accelerator board configured for a different array controller board. Configuration signature on array accelerator board does not match the one stored on the array controller board.	To recognize the array accelerator board, run the Array Configuration Utility.
Controller communication failure occurred	Controller communication failure occurred.	ADU was unable to successfully issue commands to the controller in this slot.
Controller detected. NVRAM configuration not present	EISA nonvolatile RAM does not contain a configuration for this controller.	Run the System Configuration Utility to configure the nonvolatile RAM.
Controller firmware needs upgrading	Controller firmware is below the latest recommended version.	Run Options ROMPaq to upgrade the controller to the latest firmware revision.
Controller is located in special "video" slot	Controller is installed in slot for special video control signals. If controller is used in this slot, LED indicators on front panel may not function properly.	Install the controller in a different slot and run the System Configuration Utility to configure the controller and nonvolatile RAM. Then run the Array Configuration Utility to configure controller.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Controller is not configured	Controller is not configured. If controller was previously configured and you change drive locations, there may be a problem with placement of the drives. ADU examines each physical drive and looks for drives that have been moved to a different drive bay.	Look for messages indicating which drives have been moved. If none appear and drive swapping did not occur, run the Array Configuration Utility to configure the controller and the System Configuration Utility to configure nonvolatile RAM. **Do not** run either Utility if you believe drive swapping has occurred.
Controller reported POST error. Error Code: x	The controller returned an error from its internal Power-On Self Tests.	Replace the controller.
Controller restarted with a signature of zero	ADU did not find a valid configuration signature to use to get the data. Nonvolatile RAM may not be present (unconfigured) or the signature present in nonvolatile RAM may not match the signature on the controller.	Run the System Configuration Utility to configure the controller and nonvolatile RAM.
Disable command issued	Posted-writes have been disabled by the issuing of the Accelerator Disable command. This occurred because of an operating system device driver.	Restart the system. Run the Array Configuration Utility to reinitialize the array accelerator board.
Drive (bay) X firmware needs upgrading	Firmware on this physical drive is below the latest recommended version.	Run the Options ROMPaq Utility to upgrade the drive firmware to the latest revision.
Drive (bay) X has insufficient capacity for its configuration	Drive has insufficient capacity to be used in this logical drive configuration.	Replace this drive with a larger capacity drive.
Drive (bay) X has invalid M&P stamp	Physical drive has invalid monitor and performance data.	Run the System Configuration Utility to properly initialize this drive.
Drive (bay) X has loose cable	The array controller could not communicate with this drive at power-up. This drive has not previously failed.	Check all cable connections first. The cables could be bad, loose, or disconnected. Turn on the system and attempt to reconnect signal/power cable to the drive. If this does not work, replace the cable. If that does not work, the drive may need to be replaced.
Drive (bay) X is a replacement drive	This drive has been replaced. This message displays if a drive is replaced in a fault tolerant logical volume.	If the replacement was intentional, allow the drive to rebuild.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Drive (bay) X is a replacement drive marked OK	This drive has been replaced and marked OK by the firmware. This may occur if a drive has an intermittent failure (for example, if a drive has previously failed, then when ADU is run, the drive starts working again).	Replace the drive.
Drive (bay) X is failed	The indicated physical drive has failed.	Replace the drive.
Drive (bay) X is undergoing drive recovery	This drive is being rebuilt from the corresponding mirror or parity data.	Normal operations should occur.
Drive (bay) X needs replacing	The 210-megabyte hard drive has firmware version 2.30 or 2.31.	Replace the drive.
Drive (bay) X upload code not readable	An error occurred while ADU was trying to read the upload code information from this drive.	If there were multiple errors, this drive may need to be replaced.
Drive (bay) X was inadvertently replaced	The physical drive was incorrectly replaced after another drive failed.	Replace the drive that was incorrectly replaced and replace the original drive that failed. Do not run the System Configuration Utility and try to reconfigure; data will be lost.
Drive Monitoring features are unobtainable	ADU unable to get monitor and performance data due to fatal command problem such as drive time-out, or unable to get data due to these features not supported on the controller.	Check for other errors (time-outs, and so on). If no other errors occur, upgrade the firmware to a version that supports monitor and performance, if desired.
Drive Monitoring is NOT enabled for SCSI Port x Drive ID x	The monitor and performance features have not been enabled on this drive.	Run the System Configuration Utility to initialize the monitor and performance features.
Drive time-out occurred on physical drive bay X	ADU issued a command to a physical drive and the command was never acknowledged.	The drive or cable may be bad. Check the other error messages on the Diagnostics screen to determine resolution.
Drive X indicates position Y	Message indicates physical drive, which appears to be scrambled or in a drive bay other than the one for which it was originally configured.	Examine the graphical drive representation on ADU to determine proper drive locations. Remove drive X and place it in drive position Y. Rearrange the drives according to the ADU instructions
Duplicate write memory error	Data could not be written to the array accelerator board in duplicate due to the detection of parity errors. This is not a data loss situation.	Replace the array accelerator board.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Error occurred reading RIS copy from SCSI Port x Drive ID x	An error occurred while ADU was trying to read the RIS from this drive.	If there were multiple errors, this drive may need to be replaced.
FYI: Drive (bay) X is non-Compaq supplied	The installed drive was not supplied by Compaq.	If problems exist with this drive, replace it with a Compaq drive.
Identify controller data did not match with NVRAM	The identify controller data from the array controller did not match the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured. It could also occur if the firmware on the controller has been upgraded and the System Configuration Utility was not run.	Check the identify controller data under the Inspect Utility. If the firmware version field is the only thing different between the controller and nonvolatile RAM data, this is not a problem. Otherwise, run the System Configuration Utility.
Identify logical drive data did not match with NVRAM	The identify unit data from the array controller did not match with the information stored in nonvolatile RAM. This could occur if new, previously configured drives have been placed in a system that has also been previously configured.	Run the System Configuration Utility to configure the controller and nonvolatile RAM.
Insufficient adapter resources	The adapter does not have sufficient resources to perform operations to the array accelerator board. Drive rebuild may be occurring.	Operate the system without the array accelerator board until the drive rebuild completes.
Less than 75% batteries at sufficient voltage	Operation of array accelerator board has been disabled due to less than 75% of battery packs being at sufficient voltage level.	Allow sufficient time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.
Less than 75% batteries at sufficient voltage. Battery pack X below reference voltage.	Battery pack on array accelerator is below required voltage levels.	Allow sufficient time for batteries to recharge (36 hours). If batteries have not recharged after 36 hours, replace the array accelerator board.
Logical drive X failed due to cache error	This logical drive failed due to a catastrophic cache error.	Replace the array accelerator board and reconfigure using the Array Configuration Utility.

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Logical Drive X status = FAILED	This status could be issued for several reasons. If this logical drive is configured for No Fault Tolerance and one or more drives fail, this status will occur. If mirroring is enabled, and any two mirrored drives fail, this status will occur. If Data Guarding is enabled, and two or more drives fail in this unit, this status will occur. This status may also occur if another configured logical drive is in the WRDNG DRIVE REPLACED or LDDSE CABLE DETECTED state.	Check for drive failures, wrong drive replaced, or loose cable messages. If there was a drive failure, replace the failed drive(s), then restore the data for this logical drive from the tape backup. Otherwise, follow the wrong drive replaced or loose cable detected procedures.
Logical Drive X status = INTERIM RECOVERY	A physical drive in this logical drive has failed. The logical drive is operating in interim recovery mode and is vulnerable.	Replace the failed drive as soon as possible.
Logical Drive X status = LDDSE CABLE DETECTED	A physical drive has a cabling problem.	Turn the system off and attempt to reattach the cable onto the drive. If this does not work, replace the cable.
Logical Drive X status = NEEDS RECOVER	A physical drive in this logical drive has failed and has now been replaced. This drive needs to be rebuilt from the mirror drive or the parity data.	When booting up the system, select the "F1 - rebuild drive" option to rebuild the replaced drive.
Logical Drive X status = OVERHEATED	The temperature of the Intelligent Array Expansion System drives is beyond safe operating levels and it has shut down to avoid damage.	Check the fans and the operating environment.
Logical Drive X status = OVERHEATING	The temperature of the Intelligent Array Expansion System drives is beyond safe operating levels.	Check the fans and the operating environment
Logical Drive X status = RECOVERING	A physical drive in this logical drive has failed and has now been replaced. The replaced drive is rebuilding from the mirror drive or the parity data.	Nothing needs to be done. Normal operations can occur.
Logical Drive X status = WRDNG DRIVE REPLACED	A physical drive in this logical drive has failed. The incorrect drive was replaced.	Replace the drive that was incorrectly replaced. Then, replace the original drive that failed with a new drive. Do not run the System Configuration Utility to reconfigure; data on drive will be lost.
Loose cable detected - logical drives may be marked FAILED until corrected	ADU found loose cable. If logical drives are marked FAILED, those logical drives will be unusable until problem corrected.	Power down the system. Check cable(s) for tight connection to logical drives. Restart system. If same message occurs again, cable(s) may be bad.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Loose cable detected - logical drives may be marked FAILED until corrected	Controller unable to communicate with one or more physical drives, probably because of a cabling problem. Logical drives may be in a FAILED state until the condition is corrected, preventing access to data on the controller.	Check all controller and drive cable connections.
Mirror data miscompare	Data was found at reinitialization in the posted write memory, however, the mirror data compare test failed resulting in data being marked as invalid. Data loss is possible.	Replace the array accelerator board.
No configuration for accelerator board	The array accelerator board has not been configured.	If the array accelerator board is present, run the Array Configuration Utility (ACU) to configure the board.
NVRAM configuration present, controller not detected	EISA nonvolatile RAM has a configuration for an array controller but there is no board in this slot. Either a board has been removed from the system or a board has been placed in the wrong slot.	Place the array controller in the proper slot or run the System Configuration Utility to reconfigure nonvolatile RAM to reflect the removal or new position.
RIS copies between drives do not match	Drives on controller contain copies of RIS which do not match.	Upgrade ADU to the most recent version.
SCSI Port x Drive ID x has exceeded threshold(s)	Monitor and performance threshold for this drive has been violated.	Check for the particular threshold that has been violated.
SCSI Port x Drive ID x is not stamped for monitoring	Drive has not been stamped with monitor and performance features.	Run the Array Configuration Utility (ACU). Changing the configuration and saving should cause ACU to stamp drive with monitor and performance features. To do this without destroying the current configuration, change array accelerator size and save configuration. Change array accelerator back to original size and save again.
SCSI Port x Drive ID x RIS copy mismatch	Copies of RIS on drive do not match.	Drive may need to be replaced. Check for other errors.
SCSI Port x Drive ID x failed – REPLACE (failure message)	ADU found drive needs to be replaced.	Replace drive or correct condition that caused error.
SCSI Port x Drive ID x firmware needs upgrading	Drive firmware is below recommended version.	Run Options ROMPaq to upgrade drive to latest firmware revision.

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
SCSI Port x Drive ID x has a loose cable. SMART is unable to communicate with drive	Drive has loose cable.	Power down the system. Check drive cable for tight connection.
SCSI Port x Drive ID x was replaced on a good volume: (failure message)	ADU found drive was replaced even though volume was fine.	No action needs to be taken.
SCSI port X, drive ID Y firmware needs upgrading	Drive's firmware may cause problems and should be upgraded.	Run Dptions RDMPaq to upgrade the drive firmware on the drive to a later revision.
Set configuration command issued	The configuration of the array controller has been updated. The array accelerator board may remain disabled until it is reinitialized.	Run the System Configuration Utility to reinitialize the array accelerator board.
Soft Firmware Upgrade required	ADU has determined that the controller is running firmware that has been soft upgraded by the Compaq Upgrade Utility. However, the firmware running is not present on all drives. This could be caused by the addition of new drives in the system	Run the Compaq Upgrade Utility to place the latest firmware on all drives.
Unable to communicate with drive on SCSI Port x, Drive ID x	Controller could not communicate with drive.	If the amber LED on the drive is on, replace the drive.
Unknown disable code	A code was returned from the array accelerator board that ADU does not recognize.	Dbtain the latest version of ADU.
Unrecoverable read error	Read parity errors were detected when attempting to read same data from both sides of mirrored memory. Data loss will occur.	Replace the array accelerator board.
WARNING - Drive Write Cache is enabled on X	Drive has its internal write cache enabled. The drive may be a third-party drive or the operating parameters may have been altered. Condition may cause data corruption if power to the drive is interrupted.	Replace the drive with a Compaq supplied drive, or restore the operating parameters of the drive.

continued

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Table 3-21
ADU Diagnostic Messages *continued*

Message	Description	Recommended Action
Warning bit detected	A monitor and performance threshold violation may have occurred. Status of a logical drive may not be DK.	Check the other error messages on the diagnostics screen for an indication of the problem.
Write memory error	Data could not be written to cache memory. This typically means that parity error was detected while writing data to cache. This could be caused by incomplete connection between cache and controller. This is not a data loss circumstance.	With power to system turned off, verify that the cache board is fully connected to controller.
Wrong Accelerator	This could mean that either the board was replaced in the wrong slot or placed in a system that was previously configured with another board type. Included with this message is a message indicating the type of adapter sensed by ADU and a message indicating the type of adapter last configured in EISA nonvolatile RAM.	Check the diagnosis screen for other error messages. Run the System Configuration Utility to update the system configuration.

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Integrated Management Log

On servers supporting the Integrated Management Display, the Compaq Integrated Management Log (IML) replaces the Critical Error Log and Correctable Memory Logs. IML records system events and stores them in an easily viewable form. Each event is marked with a time-stamp with one-minute granularity.

Events listed in the Integrated Management Log are categorized as one of four event severity levels:

- Status - indicates that the message is informational only.
- Repaired - indicates that corrective action has been taken.
- Caution - indicates a non-fatal error condition.
- Critical - indicates a component failure.

The Integrated Management Log requires Compaq Operating System-dependent drivers. Refer to the *Compaq Support Software CD* for instructions on installing the appropriate drivers.

Refer to the setup and installation guide that came with the server or the *Integrated Management Display User Guide* provided with the Integrated Management Display option kit.

Multiple Ways of Viewing the Log

You can view an event in the IML in several ways:

- On the Integrated Management Display
- From within Compaq Insight Manager
- From within the Compaq Survey Utility
- From within the IML Management Utility

Integrated Management Display

The Integrated Management Display is an LCD panel that presents information directly at the server, assisting in diagnosing and servicing the server without a keyboard and monitor.

Compaq Insight Manager

Compaq Insight Manager is a comprehensive management tool to monitor and control the operation of Compaq servers and clients. Compaq Insight Manager consists of two components: a Windows-based console application, and server- or client-based management data collection agents. Starting with Compaq Insight Manager 4.0, the agents for Windows NT and NetWare are also web-enhanced; that is, these agents enable web browser access and monitoring of management information.

The management agents monitor over 1,000 management parameters. Key subsystems are instrumented to make health, configuration, and performance data available to agent software. Agents act upon data by initiating information, such as network interface or storage subsystem performance statistics.

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Viewing the Event List

1. From Compaq Insight Manager, select the appropriate server, then select View Device Data. The selected server displays, with buttons around its perimeter.
2. Select the Recovery button ✂Integrated Management Log.
3. If a failed component has been replaced, select the event from the list, then select Mark Repaired.

Printing the Event List

NOTE: You can only view the event list from the Recovery/Integrated Management Log screen as described above.

1. From the Insight Manager, select the appropriate server.
2. Select the Configuration button ✂Recovery button ✂Print.

Compaq Survey Utility

The Compaq Survey Utility is a serviceability tool available from Windows NT and Novell NetWare that delivers online-configuration capture and comparison to maximize server availability. It is delivered on the Compaq Management CD in the SmartStart package or is available on the Compaq website. Refer to the Compaq Management CD for information on installing and running the Compaq Survey Utility.

After running the Compaq Survey Utility, view the IML by loading the output of the utility (typically called "survey.txt") into a text viewer such as Microsoft Notepad. The event list follows the system slot information. After opening the text file, print it using the print feature of the viewer.

Compaq IML Management Utility

The Compaq IML Management Utility is a DOS-based tool that gives you the off-line ability to review, mark corrected, and print events from the IML. It is located on the *Compaq SmartStart and Support Software CD*. Refer to the *SmartStart Installation for Servers* poster, which ships with the server, for information on how to install and use the IML Management Utility.

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Event List

The Event List displays the affected components and the associated error messages. Though the same basic information displays, the format of the list may differ, depending on how you view it: on the Integrated Management Display, from within Compaq Insight Manager, or the Compaq Survey Utility. An example of the format of an event displayed on the Integrated Management Display is as follows:

```
**001 of 010**
---caution---
03/19/1997
12:54 PM
FAN INSERTED
Main System
Location:
  System Board
Fan ID: 03
**END OF EVENT**
```

Event Messages

Table 3-22
Event Messages

Event Type	Event Message	Action
Machine Environment		
Fan Failure	System Fan Failure (Fan X, Location)	Replace fan
Fan Inserted	System Fan Inserted (Fan X, Location)	None
Fan Removed	System Fan Removed (Fan X, Location)	None
Fans Not Redundant	System Fans Not Redundant	Add fan
Overheat Condition	System Overheating (Zone X, Location)	Check fans
Main Memory		
Correctable Error threshold exceeded	Corrected Memory Error threshold passed (Slot X, Memory Module X)	
	Corrected Memory Error threshold passed (System Memory)	
	Corrected Memory Error threshold passed (Memory Module unknown)	
Uncorrectable Error	Uncorrectable Memory Error (Slot X, Memory Module X)	
	Uncorrectable Memory Error (System Memory)	
	Uncorrectable Memory Error (Memory Module unknown)	

continued

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Table 3-22
Event Messages *continued*

Event Type	Event Message	Action
Processor		
Correctable Error Threshold exceeded	Processor Correctable error Threshold passed (Slot X, Socket X)	
Uncorrectable Error	Unrecoverable Host Bus Data Parity Error	
Host Bus Error	Unrecoverable Host Bus Address Parity Error	
EISA Bus	EISA Expansion Bus Master Timeout (Slot X)	Power down server and replace EISA board
	EISA Expansion Bus Slave Timeout	
	EISA Expansion Board Error (Slot X)	
	EISA Expansion Bus Arbitration Error	
PCI Bus Error	PCI Bus Error (Slot X, Bus X, Device X, Function X)	Power down PCI slot and replace board
Power Subsystem		
Power Supply Failure	System Power Supply Failure (Power Supply X)	Replace power supply
Power Supply Inserted	System Power Supply Inserted (Power Supply X)	None
Power Supply Removed	System Power Supply Removed (Power Supply X)	None
Power Supply Not Redundant	System Power Supplies Not Redundant	Add power supply
System Configuration Battery Low	Real-Time Clock Battery Failing	Replace Battery
Power Module Failure	A CPU Power Module (System Board, Socket X)	Replace power module
Power Module Failure	A CPU Power Module (Slot X, Socket X)	Replace power module
Power Modules Not Redundant	System Power Modules Not Redundant	Add power module
AC Voltage Problem	System AC Power Problem (Power Supply X)	
Power AC Overload	System AC Power Overload (Power Supply X)	
Automatic Server Recovery -2		
System Lockup	ASR Lockup Detected: Cause	
Operating System		
System Crash	Blue Screen Trap: Cause [NT]	Refer to the documentation for the operating system
	Kernel Panic: Cause [UNIX]	
	Abnormal Program Termination: Cause [NetWare]	
Automatic OS Shutdown	Automatic Operating System Shutdown Initiated Due to Fan Failure	Refer to the documentation for the operating system
	Automatic Operating System Shutdown Initiated Due to Overheat Condition	
	Fatal Exception (Number X, Cause)	

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Rapid Error Recovery

Compaq servers provide rapid recovery services for diagnosing and recovering from errors. These tools are available for local and remote diagnosis and recovery.

Rapid recovery means fast identification and resolution of complex faults. The Rapid Recovery Engine and Insight Management Agents notify the system administrator when a failure occurs, ensuring that the server experiences minimal downtime. You enable these features through the System Configuration Utility. These integrated server management features are:

- Automatic Server Recovery-2 (ASR-2)
- Integrated Management Logs
- Server Health Logs (on servers not supporting Integrated Management Logs)
- Storage Fault Recovery Tracking
- Storage Automatic Reconstruction
- Network Interface Fault Recovery Tracking
- Memory Fault Recovery Tracking (with option upgrade kit)

These are discussed in more detail on the *Systems Reference Library CD* (SRL).

Automatic Server Recovery-2

Automatic Server Recovery-2 (ASR-2) lets the server restart automatically from the operating system or the Compaq Utilities. To use this feature, you must use the System Configuration Utility to install Compaq Utilities in the system partition.

You can enable the ASR-2 feature to restart a server after a critical hardware or software error occurs. If a critical error occurs, the server records the error information in the Integrated Management Log, reboots the system, and pages you. Using the Compaq System Configuration Utility, configure the system for automatic recovery or for attended local or remote access to diagnostic and configuration tools.

NOTE: ASR-2 is available only on operating systems using the ASR-2 drivers provided by Compaq.

You can also configure ASR-2 to page an administrator when the system restarts. ASR-2 depends on the application and driver that routinely notify the ASR-2 hardware of proper system operations. If the time between ASR-2 notifications exceeds the specified period, ASR-2 assumes a fault has occurred and initiates the recovery process.

To configure ASR-2:

1. Run the System Configuration Utility.
2. Select *View and Edit Details*.
3. Set the software error recovery status to Enabled.
4. Set the software error recovery time-out.

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The available recovery features are:

- **Software Error Recovery** – automatically restarts the server after a software-induced server failure
- **Environmental Recovery** – allows the server to restart when temperature, fan, or AC power conditions return to normal

Unattended Recovery

For unattended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present and you selected Paging)
- Tries to restart the operating system

Often the server restarts successfully, making unattended recovery the ideal choice for remote locations where trained service personnel are not immediately available.

If ASR-2 cannot restart the server within 10 attempts, it places a critical error in the Integrated Management Log, starts the server into Compaq Utilities, and enables remote access (if you configured remote access).

To use this level of ASR-2, you must configure ASR-2 to load the operating system after restart.

Attended Recovery

For attended recovery, ASR-2 performs the following actions:

- Logs the error information to the IML
- Resets the server
- Pages you (if a modem is present and you selected Paging)
- Starts Compaq Utilities from the hard drive
- Enables remote access

During system configuration, these utilities are placed on the system utilities partition of the hard drive.

If you have configured for dial-in access and have a modem with an auto-answer feature installed, you can dial in and remotely diagnose or reconfigure the server.

If you have configured the Compaq Utilities for network access, you can access the utilities over the network. You can use Compaq Insight Manager for dial-in or network access.

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Hardware Requirements

To use this level of ASR-2 over a modem, you need the following:

- A non-PCI Compaq or optional Hayes modem
- System Configuration Utility and Diagnostics Utility installed on the system partition of the hard drive
- ASR-2 configured to load Compaq Utilities after restart

You can also run Compaq Utilities remotely over an IPX or IP network using the Network feature:

- To use Compaq Utilities on an IPX network, you must have Compaq Insight Manager 2.0 or later or an NVT (Novell Virtual Terminal) Terminal Emulator with VT100 or ANSI terminal capabilities.
- To use Compaq Utilities on an IP network, you must have Compaq Insigbt Manager 2.10 or later, or a Telnet Terminal Emulator with VT100 or ANSI capabilities.

If you are notified that ASR-2 restarted the server and you have restarted to Compaq Utilities, use the Inspect Utility or Compaq Insight Manager to view the critical error in tbe Critical Error Log. Run Diagnostics to diagnose and resolve the problem.

You can configure ASR-2 to restart the server into Compaq Utilities to diagnose the critical error, or to start the operating system to return the server to operational status as rapidly as possible.

When you enable ASR-2 to start the operating system, the server tries to start from the primary partition. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access Compaq Utilities.

When you enable ASR-2 to start Compaq Utilities, the server restarts after a critical error and loads Compaq Utilities from the system partition on the hard drive.

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You can configure the server to start Compaq Utilities in four different ways:

- Without remote console support; for example, to run Compaq Utilities from the server console only
- With remote console support using modems for dial-in access
- With remote console support using a modem to dial a predetermined telephone number
- With remote console support through a network connection (IP or IPX)

Table 3-23
ASR-2 Features

Features	Definition
Software error recovery	If enabled, ASR-2 is activated if the OS hangs or has a crash that results in a lockup.
Software error recovery time-out	Determines how long the server waits to enable ASR-2 after an OS lockup
Standby recovery server option	If enabled, ASR-2 activation initiates a switch to a standby recovery server.
Standby recovery server port	Port used to communicate with the recovery server.
Standby recovery time-out	Determines how long the server waits to initiate switch after ASR-2 activation.
Software error recovery boot option	Allows the server to restart either into the OS or into Compaq Utilities.
Thermal shutdown	If enabled, shuts down the server if a critical thermal error occurs.
UPS shutdown	If enabled, allows the server to perform a shutdown if a UPS is activated.
UPS shutdown threshold	Determines how long the server waits to shut down after the UPS is activated. If desired, this number should provide enough time for an administrator to perform any necessary operations or to gracefully shut down the server.

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Compaq Integrated Remote Console

The standard Compaq Integrated Remote Console performs a wide range of configuration activities. Console features include:

- Accessible using ANSI terminal
- Operates independently of the operating system
- Provides for remote server reboot
- Provides access to system configuration
- Uses out-of-band communication with dedicated management modem installed in the server

For more information, see the *Integrated Remote Console User Guide* that shipped with the server.

IMPORTANT: Before configuring ASR-2, verify that the System Configuration Utility and Diagnostics software are installed on the system partition. ASR-2 must have this to start Compaq Utilities after a system restart. Compaq recommends this even if you configure ASR-2 to start the operating system.

Compaq Health Driver

The Compaq Health Driver continually resets the ASR-2 timer according to the frequency you specified in the System Configuration Utility (for example, 10 minutes). If the ASR-2 timer counts down to zero before being reset, due to an operating system crash or a server lock-up, ASR-2 restarts the server into either Compaq Utilities or the operating system (as indicated by the System Configuration parameters). The default value is 10 minutes. The allowable settings are 5, 10, 20, and 30 minutes.

For remote and off-site (unattended) servers, setting the software error recovery time-out for 5 minutes reduces server downtime and allows the server to recover quickly. For local (attended) servers located onsite, you can set the software error recovery time-out for 20 or 30 minutes, giving you time to arrive at the server if you wish to manually diagnose the problem.

The Compaq Health Driver is independent of the ASR-2 timer. You should load it and enable the ASR-2 timer. This allows the driver to detect and log information about numerous hardware and software errors in the IML. However, you cannot enable the ASR-2 timer without loading the Compaq Health Driver.

Before ASR-2 restarts the server, it records any information available about the condition of the operating system in the Critical Error Log, or the IML depending on the server support. This information can be used to diagnose an operating system crash or server lock-up, while still allowing the server to be restarted.

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The following ASR-2 flow chart shows you the sequence of events after a hardware or software error occurs:

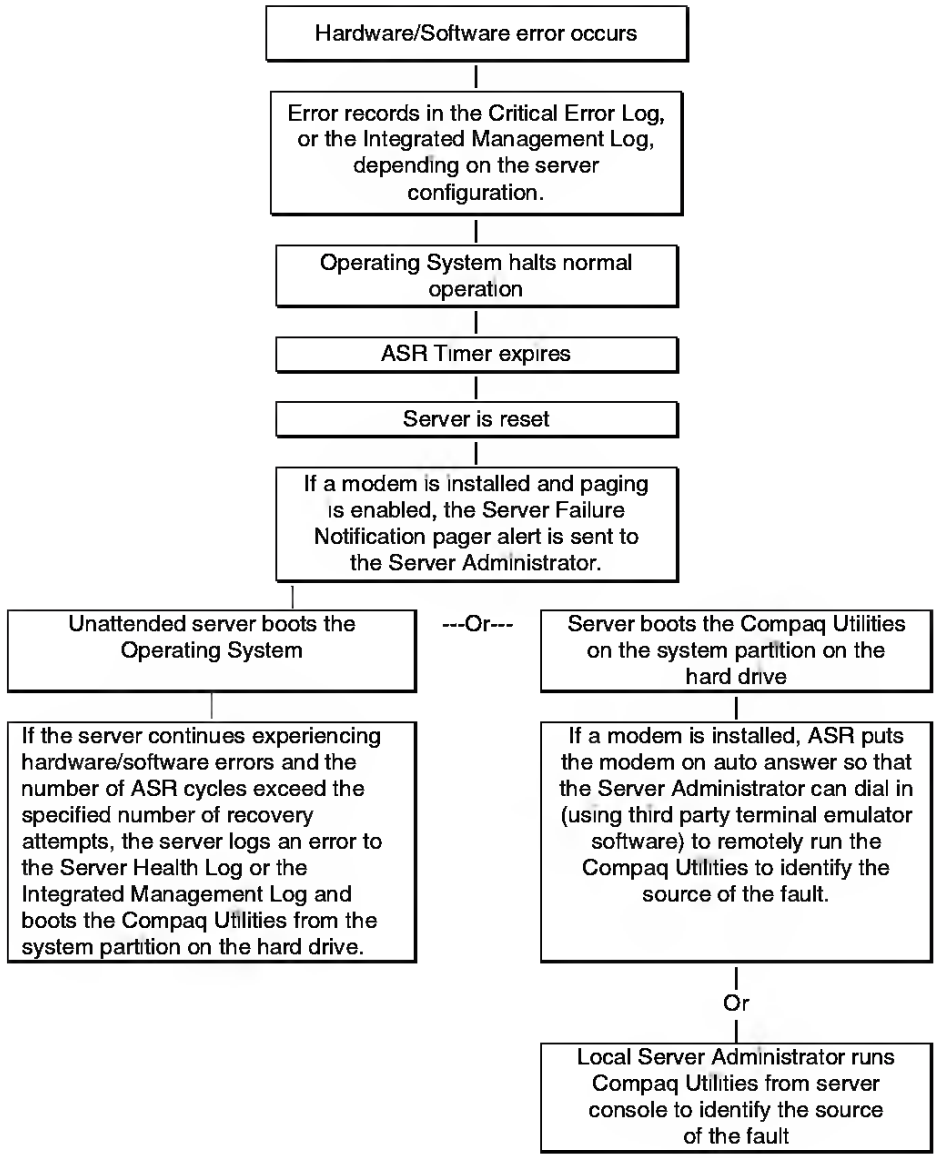
Hardware/Software error occurs
Error records in the Critical Error Log, or the Integrated Management Log, depending on the server configuration.
Operating System halts normal operation
ASR Timer expires
Server is reset
If a modem is installed and paging is enabled, the Server Failure Notification pager alert is sent to the Server Administrator.
Unattended server boots the Operating System
---Or---
Server boots the Compaq Utilities on the system partition on the hard drive
If the server continues experiencing hardware/software errors and the number of ASR cycles exceed the specified number of recovery attempts, the server logs an error to the Server Health Log or the Integrated Management Log and boots the Compaq Utilities from the system partition on the hard drive.
If a modem is installed, ASR puts the modem on auto answer so that the Server Administrator can dial in (using third party terminal emulator software) to remotely run the Compaq Utilities to identify the source of the fault.
Or
Local Server Administrator runs Compaq Utilities from server console to identify the source of the fault

Figure 3-1. ASR-2 flow chart

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Booting into Compaq Utilities

When you enable ASR-2 to start into Compaq Utilities and a critical error occurs, the operating-system-specific Health Driver logs the error information in the Critical Error Log or the IML and the ASR-2 feature restarts the server. When the system reinitializes, the system pages the designated administrator (if enabled), and starts Compaq Utilities from the hard drive.

If Dial-In status is enabled, the modem is placed in auto-answer mode. If you enable Dial-Out status, you are automatically enabled for Dial-In.

If Network Status is enabled, the appropriate network support software is loaded, depending on the network protocol, IP or IPX. This allows remote access via the network.

IMPORTANT: Compaq Utilities are loaded from a specially created system partition on the hard drive. This partition was configured during server configuration.

You can access the server and view the Server Health Logs (in servers not supporting the IML) remotely by modem, in-band over the network, or directly from the server. For modem access, you must have either Compaq Insight Manager 2.0 or above or have a VT100 or ANSI terminal type device. You may use a standard CRT with VT100 or ANSI emulation capability, or you may use a PC with a VT100 or ANSI terminal emulation package. The communication parameters must be set for 8 data bits, no parity, and 1 stop bit.

You can also enable ASR-2 to allow network access using the Network Status feature in the System Configuration Utility. You must have either Compaq Insight Manager 2.0 or greater or a Novell Virtual Terminal (NVT) emulator on an IPX network to use this feature. You must also have version 2.24 or later of the System Configuration Utility. For IP access, you must have Compaq Insight Manager 2.10 or later, or a Telnet Terminal emulator to use this feature. You also must have version 2.24 or later of the System Configuration Utility.

The System Configuration Utility settings should resemble the settings in Table 3-24 when you enable ASR-2 to start into Compaq Utilities.

Table 3-24
Compaq System Configuration Utility Pager Settings for Booting into Compaq Utilities

Pager Data	Setting	Description
Pager status	Enabled	Indicates if the pager feature is enabled or disabled.
Pager dial string	ATDT 555-5555	Indicates the pager dial string and delay before the pager message. Pagers typically use one of the following formats: Local pagers: ATDT 555-5555 Wide area pagers: ATDT 1-800-555-5555,1234567#
Pager message	1234567#	Represents a unique number (maximum seven digits, numeric only) that you must designate to identify the server on the pager display. The ROM adds a three-digit code to the front of this number. The first two indicate the subsystem and the third indicates the severity of the error that caused the alert The # symbol usually terminates the message. If no message is required, delete the # symbol.

continued

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Table 3-24
Compaq System Configuration Utility Pager Settings for Booting into Compaq Utilities *continued*

Pager Data	Setting	Description
Pager test	Select to test pager setup	Use this to test the current pager settings. Press **Enter** to dial the pager number, and the pager message (if present) displays. You must configure the computer before testing the pager and the Pager Status must be set to Enabled. Do not test the pager if you are running remotely and are using only one modem.
Serial interface	COM1	Select the communications port for the modem used by the pager and the remote ASR-2 functions. The options are COM1 and COM2.
Dial-in status	Enabled	Set Dial-In Status to Enabled. Be sure the Reset Boot option is set to Boot Compaq Utilities. When the system starts because of an ASR reset, it starts to the Compaq Utilities, sets the Management Modem to auto-answer, and waits for the administrator to dial in and run the Compaq Utilities. You automatically disable this option when you configure the software error recovery start option to Boot Operating System. When ASR pages you, you cannot dial in unless ASR-2 exceeds 10, the threshold number of server restart retries. When this happens, ASR-2 restarts the server into the Compaq Utilities and places the modem in auto-answer mode.
Dial-out status	Enabled	Allows ASR-2 to dial out to a remote workstation. If you selected this option, Dial-In Status is automatically selected. To use the dial-out feature, set Dial-Out Status to Enabled and set the Dial-Out String to the correct phone number. You must also set the Reset Boot option to Boot Compaq Utilities. When the system restarts because of an ASR reset, the administrator is paged via Pager Status and Pager Dial String, the system restarts to the Compaq Utilities, and dials out to the phone number provided in the Dial-Out string. The dial-out number will be tried five times. If it fails to connect after five attempts, the modem is put in auto-answer mode.
Dial-out string	555-1234	Enter the dial string followed by the remote computer telephone number.
Network status	Enabled	To allow network access to Compaq Utilities, set Network Status to Enabled and make sure the Reset Boot option is set to Boot Compaq Utilities.
Network protocol		To use IPX network access, set Network Protocol to IPX. When the system restarts to the Compaq Utilities because of an ASR reset, it loads IPX network support. This enables remote access via NVT. To use IP network access, set Network protocol to IP. Also make sure to set Network IP address, Network IP net mask, and Network IP router address. When the system restarts to the Compaq Utilities because of an ASR reset, it loads IP network support. This enables remote access via Telnet. **NDTE:** The Network Status must be set to Enabled for network access.
Network controller	Compaq	For all Compaq Standard Network Controllers.

continued

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Table 3-24
Compaq System Configuration Utility Pager Settings for Booting into Compaq Utilities *continued*

Pager Data	Setting	Description
Network host name	CPQHOU	Enter the network name of the server. Use underscores instead of spaces within the name, for example, Compaq_Server. If you are using IPX network access to the Compaq Utilities, this server name is used to advertise NVT host services. This server name displays in the Compaq Insight Manager server list when it determines it can communicate via NVT. Set this name to be the same as the server name you assign when the host OS is running.
Network card slot	Slot #	Select the slot number of the network interface card you wish to use for network access to Compaq Utilities.
Network frame type	ETHERNET_II	Select the frame type for the network. Selections include both Ethernet and Token Ring topologies.
Network IP address		Enter the IP address for this server in standard dot notation. **NOTE:** This is not used if you select Custom for Network controller. You must enter the IP address in the NET. CFG file that you load into the system partition.
Network IP net mask		Enter the net mask for this server in standard dot notation. **NOTE:** This is not used if you select Custom for network controller. You must enter the IP address in the NET. CFG file that you load into the system partition.
Network IP router address		Enter the router to be used for this server in standard dot notation. **NOTE:** This is not used if you select Custom for network controller. You must enter the IP address in the NET. CFG file that you load into the system partition.

If you configure the server to boot into Compaq Utilities, it prepares for remote communications. You can remotely run Diagnostics software, the Inspect Utility, or the System Configuration Utility using a workstation running terminal emulation software, such as Compaq Insight Manager or PC Anywhere.

Booting into the Operating System

When you enable ASR-2 to restart into the operating system and a critical error occurs, ASR-2 logs the error in the Critical Error Log or IML and restarts the server. The system ROM pages the designated administrator, then executes the normal restart process.

IMPORTANT: When you enable ASR-2 to restart into the operating system, Modem Dial-In Status, Network Status, and Modem Dial-Out Status are automatically disabled. In this mode, ASR-2 can page you if a critical error occurs, but you cannot access the server, and the server cannot dial out to a remote workstation.

If the ASR-2 feature cannot restart the server within 10 attempts, it logs a critical error in the Critical Error Log or IML Log restarts the server into the Compaq Utilities, and puts the modem into auto-answer mode.

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The System Configuration Utility setting should resemble the following when you enable ASR to restart into the operating system:

Table 3-25
OS Restart SCU Setting for ASR-2

Option	Setting
Serial Interface	COM1
Dial-in status	Disabled
Dial-out status	Disabled
Dial-out string	555-1234
Network status	Disabled
Network Protocol	IPX
Network Controller	Compaq
Network Host Name	CPQHOU
Network Card Slot	Slot #
Network Frame Type	ETHERNET_II
Network IP Address	xxx.xxx.xxx.xxx
Network IP Net Mask	xxx.xxx.xxx.xxx
Network IP Router Address	xxx.xxx.xxx.xxx

ASR-2 Security

The standard Compaq password features function differently during ASR-2 than during a typical system startup. During ASR-2, the system does not prompt for the Power-On Password. This allows ASR-2 to restart the operating system or Compaq Utilities without user intervention.

To maintain system security, set the server to boot in Network Server Mode (an option in the System Configuration Utility). This option ensures that the server keyboard is locked until you enter the Keyboard Password.

Select an Administrator Password (an option in the System Configuration Utility). During attended ASR-2 (local or remote), you must enter this Administrator Password before any modifications can be made to the server configuration.

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Server Health Logs

In some servers, Server Health Logs are replaced by the IML, if it is supported. See "Integrated Management Display" in this chapter for more information.

Server Health Logs contain information to help identify and correct any server failures and correlate hardware changes with server failure. Server Health Logs are stored in nonvolatile RAM and consist of the Critical Error Log and the Revision History Table.

If errors occur, information about the errors is automatically stored in the Critical Error Log.

Whenever boards or components (that support revision tracking) are updated to a new revision, the Revision History Table is updated.

ASR-2 Integrated Management Log Messages

The Integrated Management Log (IML) (or Critical Error Log for Server Health Logs) records memory errors, as well as catastrophic hardware and software errors that cause the system to fail. This information helps you quickly identify and correct the problem, thus minimizing downtime.

You can view the IML (or Critical Error Log) through the Compaq Insight Manager. The Diagnostics Utility either resolves the error or suggests corrective action in systems that do not support event logs.

The IML (or Critical Error Log) identifies and records all the following errors. Each error type is explained below.

Table 3-26
ASR-2 IML or Critical Error Log Messages

Message	Description
Abnormal Program Termination	The operating system has encountered an abnormal situation that has caused a system failure.
ASR-2 detected by ROM	An ASR-2 activity has been detected and logged by the system ROM.
ASR-2 Test Event	The System Configuration Utility generated a test alert
Automatic Server Recovery Base Memory Parity Error	The system detected a data error in base memory following a reset due to the Automatic Server Recovery-2 (ASR-2) timer expiration.
Automatic Server Recovery Extended Memory Parity Error	The system detected a data error in extended memory following a reset due to the ASR-2 timer expiration.
Automatic Server Recovery Memory Parity Error	The system ROM was unable to allocate enough memory to create a stack. Then, it was unable to put a message on the screen or continue booting the server.
Automatic Server Recovery Reset Limit Reached	The maximum number of system resets due to ASR-2 timer expiration has been reached, resulting in the loading of Compaq Utilities.
Battery Failing	Low system battery warning. Replace battery within 7 days to prevent loss of nonvolatile configuration memory. Failure of the battery supporting the system's nonvolatile RAM is imminent.

continued

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Table 3-26
ASR-2 IML or Critical Error Log Messages *continued*

Message	Description
Caution: Temperature Exceeded	The operating system has detected that the temperature of the system has exceeded the caution level. Accompanying data in the log notes if an auto-shutdown sequence has been invoked by the operating system.
Diagnostic Error	An error was detected by the Diagnostics Utility. See the specific error code in this chapter for a detailed explanation.
Error Detected On Boot Up	The server detected an error during the Power-On Self-Test (POST).
Processor Prefailure	A CPU has passed an internal corrected error threshold; excessive internal ECC cache errors.
NMI - PCI Bus Parity Error	A parity error was detected on the PCI bus.
NMI - Expansion Board Error	A board on the expansion bus indicated an error condition, resulting in a server failure.
NMI - Expansion Bus Master Time-Out	A bus master expansion board in the indicated slot did not release the bus after its maximum time, resulting in a server failure.
NMI - Expansion Bus Slave Time-Out	A board on the expansion bus delayed a bus cycle beyond the maximum time, resulting in a server failure.
NMI - Fail-Safe Timer Expiration	Software was unable to reset the system fail-safe timer, resulting in a server failure.
Processor Exception	The indicated processor exception occurred.
NMI - Processor Parity Error	The processor detected a data error, resulting in a server failure.
Server Manager Failure	An error occurred with the Server Manager/R.
NMI - Software Generated Interrupt Detected Error	Software indicated a system error, resulting in a server failure.
Caution: Temperature Exceeded	The operating system has detected that the temperature of the system has exceeded the caution level. Accompanying data in the log notes if an auto-shutdown sequence has been invoked by the operating system.
Abnormal Program Termination	The operating system has encountered an abnormal situation that has caused a system failure.
ASR-2 Test Event	The System Configuration Utility generated a test alert.
NMI- Automatic Server Recovery Timer Expiration	The operating system has received notice of an impending ASR-2 timer expiration.
Required System Fan Failure	The required system fan has failed. Accompanying data in the log notes if an auto-shutdown sequence has been invoked by the operating system.
UPS A/C Line Failure Shutdown or Battery Low	The UPS notified the operating system that the AC power line has failed. Accompanying data indicates if an auto-shutdown sequence has been invoked or if the battery has been nearly depleted.
ASR-2 detected by ROM	An ASR-2 activity has been detected and logged by the system ROM.

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Revision History Table

Some errors can be resolved by reviewing changes to the server configuration. The server has an Automatic Revision Tracking (ART) feature that helps you review recent changes to the server configuration.

One ART feature is the Revision History Table, which contains the hardware version number of the system board and any other system boards providing ART-compatible revision information. This feature lets you determine the level of functionality of an assembly in a system without opening or powering down the unit.

Table 3-27
Revision History Format

Current Revisions	
Data	10/31/95
System Board Revision	03
Assembly Version	1
Functional Revision Level	C
Processor 01 Revision	01
Assembly Version	1
Functional Revision Level	A
Previous Revisions	
Date	03
System Board Revision	03
Assembly Version	1
Functional Revision Level	C
Processor 01 Revision	01
Assembly Version	1
Functional Revision Level	A

The Revision History Table is stored in nonvolatile RAM and is accessed through the Inspect Utility and Compaq Insight Manager.

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Storage Fault Recovery Tracking

This feature tracks over 12 failure-indication parameters, such as time-outs, spin-up, and self-test errors of SCSI drives. You can use these parameters to pinpoint failed storage subsystem components and to recover from controller or hard drive failure.

Storage Automatic Reconstruction

This feature automatically reconstructs data to an online spare or to a replaced drive if a drive fails. To use the reconstruction feature, you must configure the server for drive mirroring or data guarding. The reconstruction decreases system downtime by allowing rapid recovery to full system operation if a drive fails.

Network Interface Fault Recovery Tracking

This feature tracks over 20 failure indication parameters, such as alignment errors, lost frames, and frame copy errors of Ethernet and Token Ring network interfaces. It decreases network downtime by enabling diagnosis of actual network interface failures.

Memory Fault Recovery Tracking

This feature inspects the operation of the memory subsystem looking for uncorrectable memory errors.

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Remote Service Features

Compaq servers have the following management features that you can access via modem or network:

Table 3-28
Compaq Servers Remote Management Features

Feature	Description
Service Session	Provides remote access to all the utilities on the system partition, including Diagnostics utilities, Inspect, ROMPaq, Drive Array Advanced Diagnostics (DAAD), and the System Configuration Utility. Also provides the capability for remote file transfer services to and from the system partition.
Disk-Based Diagnostics	Provides remote diagnostic capability after you configure ASR-2 and the reset restart option to restart from Compaq Utilities. Also allows you to view Health Logs. Disk-based diagnostics can also be run locally. Press **F10** during the restart process when the cursor moves to the upper-right corner of the monitor.
Server Restart	Provides the ability to restart the server remotely from Compaq Insight Manager while the operating system is running. Allows the server to restart back to the operating system or restart to the system partition. Provides a complete system reset to all peripherals. If you select Boot to Compaq Utilities from Compaq Insight Manager, Compaq Utilities loads the appropriate remote services so that remote access is available. If network status is enabled, network support is loaded. If Dial-In status is enabled, the modem is set to auto-answer.
Configuration Utility	Allows you to run the remote System Configuration Utility locally. Press **F10** during the restart process when the cursor moves to the upper-right corner of the monitor.
Firmware Updates	Allows you to update the server firmware remotely. Uses firmware images on the system partition that might have been previously uploaded with the file transfer services.

ROMPaq Error Recovery Options

From time to time it may be desirable to upgrade the current system ROM. Some reasons for this may be as follows:

- Customer desires ROM upgrade
- Obtained new SmartStart CD-ROM
- Desire to upgrade server processors
- Request from Compaq

The process of upgrading the system ROM is referred to as flashing the ROM. Flashing consists of using software to replace the current ROM image with a new one through ROMPaq.

Should an error such as a power failure occur during this process, the flash operation will not be completed, causing the ROM image to be corrupted. Compaq provides two options for ROMPaq recovery, depending on the server and circumstances involved.

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ROMPaq Disaster Recovery

The option following should be utilized by any server that does not have a valid ROM image.

1. Build a fresh ROMPaq diskette, using the latest version for the server involved.

   NOTE: If the ROM is corrupted by a ROMPaq interruption, the initial ROMPaq attempt may have affected the contents of the original diskette.

2. Power down the server.
3. Set configuration switches 1, 4, 5, and 6 on the system maintenance switch block to ON to enable disaster mode.

Table 3-29
Configuration Switches

Switch	Function
1	Disable on-board video
4	Disable diskette drive
5	Disable password
6	Clear NVRAM

4. Insert the ROMPaq diskette. Although you will utilize a normal ROMPaq diskette, this situation will not allow you to save the old image.
5. Power on the server. The keyboard, mouse and monitor are all inactive. The IMD is active, if your server has one.
6. The server makes 2 long beeps, to indicate that you are in Disaster Recovery Mode, and should insert the ROMPaq diskette. The IMD, if your server has one, displays: "Please insert ROMPaq diskette."
7. The server reads the diskette for the latest ROM image. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.

   NOTE: The IMD will display the "Please insert ROMPaq diskette" message even after a valid ROMPaq diskette has been installed – this is normal behavior. The server should stop beeping to indicate that the diskette is a valid ROMPaq diskette.

8. The ROMPaq diskette flashes the system ROM.

   During this process, the IMD displays "ROMPaq flashing system ROM."

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9. At the successful completion of this process, the IMD displays:

   "ROMPaq flash successful - Cycle Power." -Or- If the flash is not successful, the IMD displays "ROMPaq flash failed."

10. After successful completion of this process,

    c. Power down the server

    d. Reset configuration switches 1, 4, 5 and 6. (Refer to Configuration Switches Table within this section.)

    e. Power up the server as usual.

After a failed ROMPaq, power down the server and repeat the above process.

Compaq Insight Manager

Compaq Insight Manager is the Compaq application for easily managing network devices. Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the servers.

In Compaq servers, every hardware subsystem, such as disk storage, system memory, and system processor, has a robust set of management capabilities. Compaq Full-Spectrum Fault Management prevents faults before they happen, keeps the system up and running in the unlikely event of a failure, and delivers rapid server recovery to normal operation after a fault.

Features of Compaq Insight Management

Compaq Insight Management features include:

- Web browser access to Insight Manager Device and Configuration information from anywhere you have network access and a standard web browser for Windows NT and NetWare servers.
- Comprehensive Fault Management - for all major subsystems, including pre-failure alerts in advance of potential system failures.
- Broad configuration management provides effective deployment and maintenance of consistent, manageable configurations with Insight Version Control and Integration Server Maintenance. Version Control and Integration Server Maintenance allows the administrator to monitor and update versions of the server and workstation firmware, drivers and utilities.
- Performance Management - Sets performance and capacity thresholds for management variables related to CPU and bus utilization, NIC throughput, logical disk capacity, and more.
- Workstation Management - Monitors and manages Compaq Professional Workstations.
- Client Management - Manages faults and assets on Compaq Deskpro computers.
- Netelligent Management - Receives alarms from Netelligent devices. Full management of Netelligent devices is supported through integration with Compaq Netelligent Management Software.
- Asset Management - Exports asset information from the Compaq Insight Manager database to leading database and spreadsheet applications.

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- Remote Management - Manages in-band or out-of-band devices, online or offline, from any location.
- Integration with Enterprise Management Platforms - Provides integration witb leading management platforms including HP OpenView, IBM NetView, SunNet Manager, and Microsoft Systems Management Server.
- Full integration with Compaq Remote Insight Board/PCI and ProLiant Integrated Remote Console which allows "in-band" and "out-of-band" connection for server management to ensure that customers are in touch with their systems, even when they are off-line or without power.
- SNMP standards provide integration with other management products.
- Flexible network conductivity supports multiple transport protocols including IPX, TCP/IP and PPP to operator over LANs, WANs, and modems.
- Support for the following leading operating systems:
  - Microsoft Windows NT
  - Novell NetWare, IntranetWare and IntranetWare for Small Business
  - SCO UNIX, OpenServer, and UnixWare
  - IBM OS/2 Warp family of products
- Reporting - Using Automatic Data Collection, gatbers historic performance information for graphing or export purposes.

Compaq Insight Management Software Architecture

The Compaq Insight Management software architecture is typical of other network management solutions. It has a client/server architecture and is composed of agent software (Compaq Insight Management Agents) and the management application software (Compaq Insight Manager).

Insight Management Agents

Insight Agents operate on Compaq systems (such as servers and workstations), performing in-depth monitoring of the system's state by collecting and measuring system parameters. These parameters indicate the current state of subsystems by counting the occurrence of particular events (for example, the number of read operations performed on a disk drive) or monitoring the state of a critical function (such as whether the cooling fan is operating).

Insight Desktop Agents operate on Compaq Deskpro computers, monitoring functions tbat include temperature sensing and disk pre-failure alerting.

Insight Agents provide information to management applications such as Compaq Insight Manager, and can generate alarm notifications if significant cbanges occur in the fault or performance aspects of system operation. Information is delivered to and from the Insight Agents by the industry-standard Simple Network Management Protocol or SNMP.

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Compaq Insight Manager

Compaq Insight Manager delivers intelligent monitoring and alerting as well as visual control of the Compaq hardware. In the unlikely event of hardware failures, Compaq Insight Manager also provides a full complement of remote maintenance and control facilities.

For additional information, refer to the online *Compaq Insight Manager User Guide* on the Systems Reference Library CD that accompanied the server.

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Chapter 4

Connectors, Switches, LEDs, and Jumpers

This chapter provides connector, switch, LED, and jumper information for Compaq ProLiant 5500 and 5500R Servers.

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Ultra2 Backplane Board Connectors

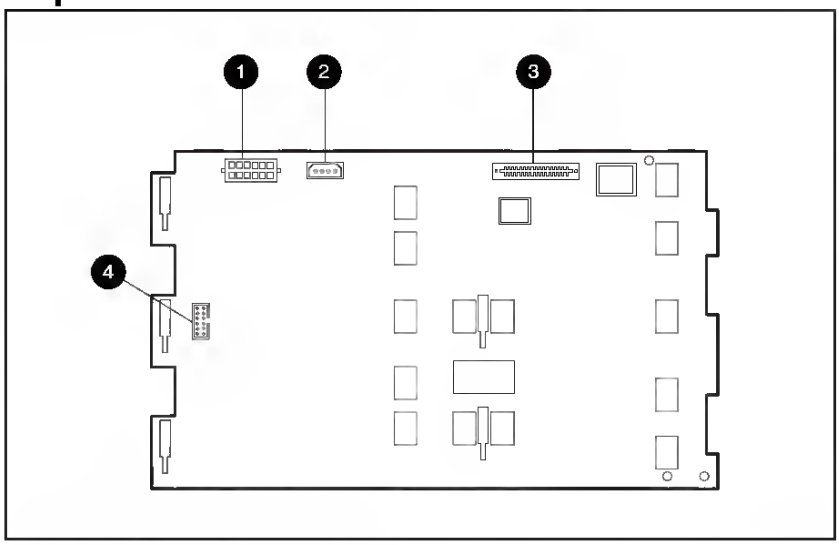

Figure 4-1. Ultra2 Backplane Board connectors

Table 4-1
Ultra2 Backplane Board Connectors

Connector	Description
	Ultra2 Backplane Board power connector
	Removable Media Power Connector
	SCSI Bus Input Connector
	Fan Connector

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Rear Connectors

The Compaq ProLiant 5500 and 5500R Server rear connectors are shown below. See Table 4-2 for connector names.

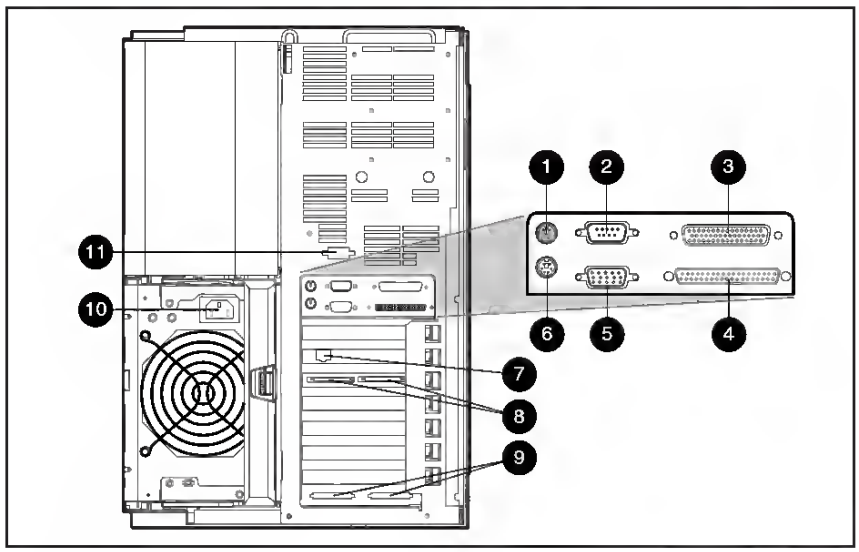

Figure 4-2. Rear connectors

Table 4-2
Rear Connectors

Reference	Description
	Keyboard connector
	Serial A connector
	Parallel port connector
	External SCSI connector
	Video connector
	Mouse connector
	NIC (RJ-45) connector
	VHDCI Ultra2 external Port 2
	VHDCI SCSI knockouts
	Power supply outlet
	Serial B Connector

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System I/O Board Components

The Compaq ProLiant 5500 and 5500R System I/O board components are shown below. See Table 4-3 for component names.

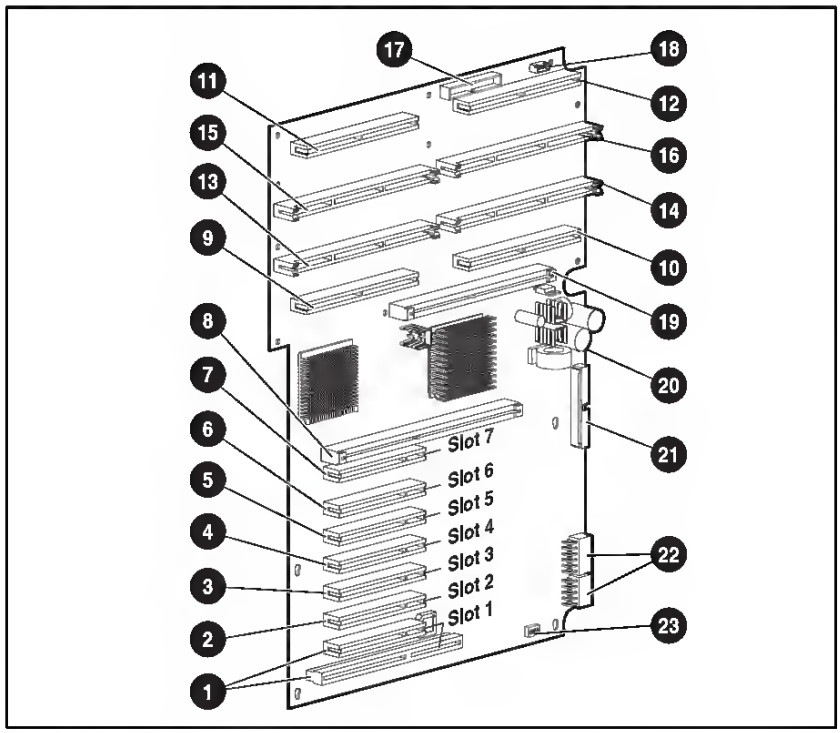

Figure 4-3. System I/O Board components

Table 4-3
System I/O Board Components

Reference	Component
	Shared PCI/ISA slots (slot 1)
, , ,	Secondary PCI bus slots
,	Primary PCI bus slots
	Peripheral board connector
, , ,	Processor power module connectors
, , ,	Processor/terminator connectors
	Diskette signal connector
	Diskette power connector

continued

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Table 4-3
System I/O Board Components *continued*

Reference	Component
	Memory board connector
	Power supply signal connector
	IDE connector
	System board power connectors
	Core frequency switch

System Board Core Frequency Switch

The following table defines the switch settings for the processor core frequency. See Figure 4-4 and Table 4-4 for correct switch positions.

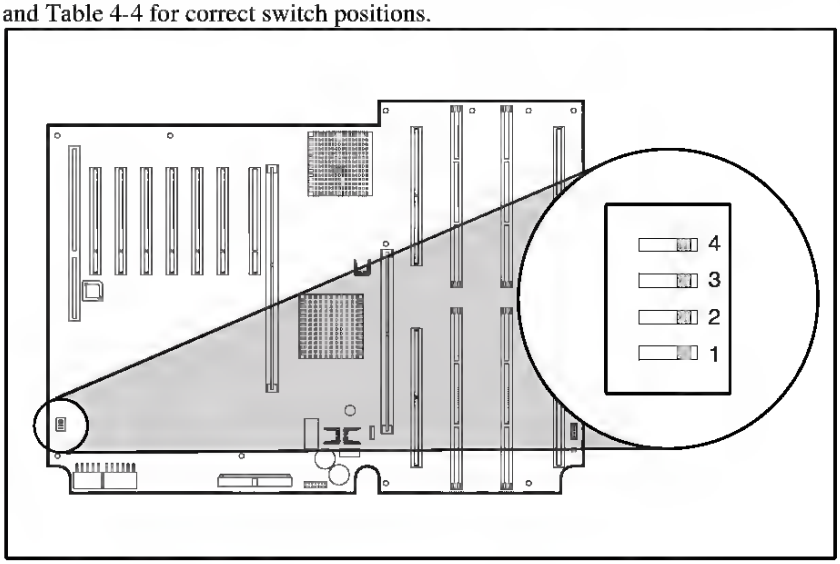

Figure 4-4. Core frequency switch

Table 4-4
Processor Core Frequency Switch Settings

Toggle	400 Mhz	450 Mhz	500 Mhz	550 Mhz
1	ON	OFF	ON	OFF
2	ON	ON	ON	ON
3	OFF	OFF	OFF	OFF
4	ON	ON	OFF	ON

NOTE: Compaq makes no representation or warranty that processors that operate at any of the speeds shown will be available at any time. Therefore, processor core speeds shown are not necessarily representative of future processors.

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Peripheral Board Components

The Peripheral Board components are shown below. See Table 4-5 for component names.

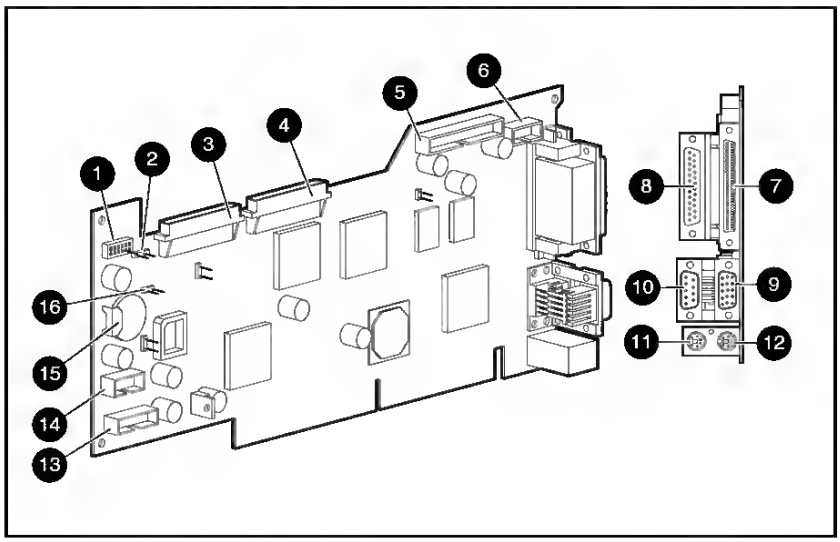

Figure 4-5. Peripheral board components

The following table shows the Peripheral Board components.

Table 4-5
Peripheral Board Components

Identifier	Description	Identifier	Description
	System configuration switch		Video connector
	External battery connector		Serial A connector
	Wide Ultra SCSI Port 1 connector		Keyboard connector
	Wide Ultra SCSI Port 2 connector		Mouse connector
	Integrated Management Display connector		Fan cable assembly connector
	Serial B connector		Power switch connector
	External Wide Ultra SCSI connector		Internal battery
	Parallel port connector		Internal battery jumper (use external battery if removed)

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Peripheral Board Configuration Switches

The Compaq ProLiant 5500 and 5500R Peripheral Board configuration switches are shown below. See Table 4-6 for switch positions.

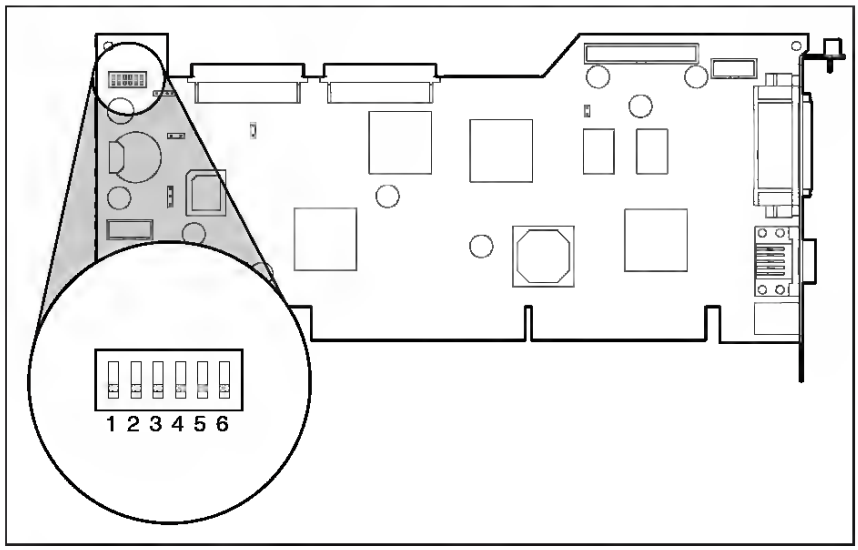

Figure 4-6. Peripheral board switches

Table 4-6
Peripheral Board Switches

Switch	Open (Off) Default Position	Closed (On) Position
1 Video	Enable integrated video	Disable integrated video
2 Lock Configuration	Configuration can be changed	Configuration can not be changed
3 Rack Mount	System is tower configuration	System is rack mount configuration
4 Diskette Override	Diskette boot is controlled by configuration	Diskette drive is enabled for booting regardless of configuration
5 Password Enable	Power-on password is enabled	Power-on password is disabled
6 Maintenance	NV RAM is valid	NV RAM is invalidated, configuration is lost

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System Board Interlock LED Indicators

The Compaq ProLiant 5500 and 5500R server interlock system prevents power distribution throughout the system if the memory board, processors, or Peripheral Board (including the power switch cable) are not fully installed or properly seated. ProLiant 5500 and 5500R servers are not equipped with chassis interlocks; the board interlocks provided connect the memory board, processors, and Peripheral Board (including the power switch cable) in one interlock chain. When one of the connected components in the interlock chain is improperly seated in the connector, the LED associated with the fault origination point illuminates. The ProLiant 5500 and 5500R system board LEDs are illustrated below. See Table 4-7 for the interlock system LED indicators.

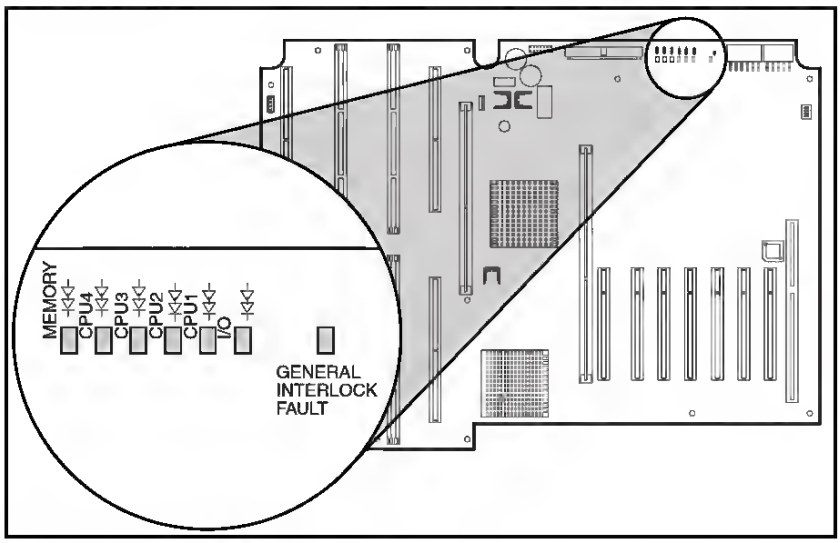

Figure 4-7. System board interlock LEDs

Table 4-7
System Board Interlock LED Indicators

		LED Labels				
Memory	**CPU4**	**CPU3**	**CPU2**	**CPU1**	**I/O**	**Faulty Device**
ON	**ON**	**ON**	**ON**	**ON**	**ON**	Memory Board
OFF	**ON**	**ON**	**ON**	**ON**	**ON**	Processor 4
OFF	OFF	**ON**	**ON**	**ON**	**ON**	Processor 3
OFF	OFF	OFF	**ON**	**ON**	**ON**	Processor 2
OFF	OFF	OFF	OFF	**ON**	**ON**	Processor 1
OFF	OFF	OFF	OFF	OFF	**ON**	Peripheral Board
OFF	OFF	OFF	OFF	OFF	OFF	No interlock error

NOTE: Only the left-most illuminated LED in any given row can provide a valid indication of the interlock error. After ensuring the server is powered down and power cables are disconnected, reseat the device associated with the left-most illuminated LED.

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Chapter 5

Physical and Operating Specifications

This section provides operating and performance specifications for Compaq ProLiant 5500 and 5500R Servers and optional hardware. Specifications are provided for the following:

- System Unit
- Hot-Plug Power Supply
- Dual Inline Memory Modules
- 1.44-MB Diskette Drive
- 24X or greater IDE CD-ROM Drive
- Integrated Dual-Channel Wide-Ultra SCSI Controller
- 64-bit Dual Channel Wide Ultra2 SCSI Adapter
- Smart Array 3200 Controller
- NIC
- Non-Hot-Plug Hard Drives
- Hot-Plug Hard Drives

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System Unit

Table 5-1
System Unit Specifications

	U.S.	Metric
Dimensions		
Height	19 in	48.3 cm
Depth	24.5 in	30.5 cm
Width	12 in	62.2 cm
Weight with one power supply and no hard drive	90 lb	40.9 kg
Input Requirements	Low range	High range
Rated Input Voltage	100 to 120 V	200 to 240 V
Rated Input Frequency	50 to 60 Hz	50 to 60 Hz
Input Power	780W @ 110 VAC/1100W @ 220 VAC	
Rated Input Current	8 A	6 A
Power Supply Output Power	Low range	High range
Rated Steady-State Power	500 W	750 W
Maximum Peak Power	540 W	780 W
Temperature Range		
Operating	50° to 95°F	10° to 35°C
Non-operating	-20° to 140°F	-30° to 60°C
Shipping	-22° to 122°F	-30° to 60°C
Relative Humidity (noncondensing)		
Operating	20% to 80%	20% to 80%
Nonoperating	5% to 90%	5% to 90%
Maximum Wet Bulb Temperature	101.7°F	38.7°C
Acoustic Noise	NPEL (BELS)	Average SPL (dBA)
Idle (fixed disk drives spinning)	6.0	43
Operating (random seeks to fixed disks)	6.1	44
Heat Dissipation	2594 BTU/h	3754 BTU/h

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Dual Inline Memory Modules (DIMMs)

Table 5-2
DIMM Specifications

Size	32-, 64-, 128-, or 256-MB
Speed	60 ns or faster; ships with 50 ns
Upgrade Requirement	Bank of 4 identical DIMMs installed or removed at a time

NOTE: Use only 32-, 64-, 128- or 256-MB; EDO- buffered; gold-connector; ECC; 4-K or 8-K refresh DIMMs.

1.44-MB Diskette Drive

Table 5-3
1.44-MB Diskette Drive Specifications

Size	3.5 in
LED Indicators (front panel)	Green
Read/Write Capacity per Diskette (high/low density)	1.44 MB/720 KB
Drive Supported	One
Drive Height	One-Third
Drive Rotation (rpm)	300 rpm
Transfer Rate bits/sec (high/low)	500/250 Kb/s
Bytes/Sector	512
Sectors/Track (high/low)	18/9
Tracks/Side (high/low)	80/80
Access Times	
Track-to-Track (high/low)	3 ms/6 ms
Average (high/low)	169/94 ms
Settling Time	15 ms
Latency Average	100 ms
Cylinders (high/low)	80/80
Read/Write Heads	Two

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24X or Greater IDE CD-ROM Drive

Table 5-4
24X or Greater IDE CD-ROM Drive Specifications

Applicable Disk	CD-ROM (Mode 1 and 2); CD-DA; CD-XA (Mode 2, Form 1 and 2); Photo CD (Single and Multiple Session); Mixed Mode (audio and data combined)	
Capacity	550 MB (Mode 1, 12 cm); 640 MB (Mode 2, 12 cm)	
Block Size	2048 bytes (Mode 1); 2340, 2336, 1024 bytes (Mode 2), 2352 bytes (CD-DA), 2328 bytes (CD-XA)	
	U.S.	**Metric**
Dimensions		
Height	1.88 in	4.29 cm
Depth	8.11 in	20.8 cm
Width	5.85 in	15 cm
Weight	2.09 lb	.95 kg
Data Transfer Rate		
Sustained	150 KB/s (1x audio)	
Burst	2100-4800 KB/s	
Access Times (typical)		
Full Stroke	150 ms	
Random, 8X speed	100 ms	
Disk		
Diameter	4.7 in, 3.15 in	12 cm, 8 cm
Rotational speed	4200 rpm maximum	
Center Hole (diameter)	.6 in	15 mm
Thickness	.048 in	1.2 mm
Track pitch	1.6 µm	

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24X or Greater IDE CD-ROM Drive Specifications *Continued*

	U.S.	Metric
Interface	IDE (ATAPI)	
Cache/Buffer	128 KB	
Audio Output Level		
Line Out	0.7 VRMS at 47 kΩ	
Headphone	0.6 VRMS at 32 Ohms (max)	
Cache buffer	128 KB	
Startup Time	< 7 seconds	
Stop Time	< 4 seconds	
Laser Parameters		
Type	Semiconductor Laser GaAlAs	
Wave Length	780 nm +/- 25 nm	
Divergence Angle	53.5 degrees +/- 1.5 degrees	
Output Power	0.14 mW	
Operating Conditions		
Temperature	41° to 113°F	5° to 45°C
Humidity	10% - 80%	

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Integrated Dual-Channel Wide Ultra SCSI Controller

Table 5-5
Integrated Dual-Channel Wide-Ultra SCSI Controller Specifications

Drives Supported	Up to seven SCSI-2 and/or Wide-Ultra devices per channel
Data Transfer Method	32-Bit PCI bus master
SCSI Channel Transfer Rate	40 MB/s per channel
Maximum Transfer Rate per PCI Bus	133 MB/s
SCSI Termination	Active Termination
SCSI Connectors	1 external, (68-pin)
	2 internal, (68-pin)

64-bit Dual Channel Wide Ultra2 SCSI Adapter

Table 5-6
64-bit Dual Channel Wide Ultra2 SCSI Adapter Specifications

Drives Supported	Up to fifteen SCSI devices per channel
Data Transfer Method	64-bit PCI bus master
SCSI Channel Transfer Rate	80 MB/s per channel
Maximum Transfer Rate per PCI Bus (peak)	133 MB/s
SCSI Termination	Active Termination
SCSI Connectors	2 external (80-pin), 2 internal (68-pin)

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Smart Array 3200 Controller

Table 5-7
Smart Array 3200 Controller Specifications

Drives Supported	Up to 15 drives per channel, 30 drives maximum
Data Transfer Method	32-Bit PCI bus master
SCSI Channel Transfer Rate	40 MB/s per channel
Maximum Transfer Rate per PCI Bus	133 MB/s
Total Transfer Rate	160 MB/s (80 MB/s per channel)
Software Upgradeable Firmware	Yes
Cache	64-MB Array Accelerator
Reliability Features	
Distributed Data Guarding	Yes
Data Guarding (RAID 4)	Yes
Drive Mirroring (RAID 1)	Yes
Drive Stripping (RAID 0)	Yes
Automatic Data Recovery	Yes
SCSI Termination	Active Termination
SCSI Connectors	1 external, (68-pin)
	2 internal, (68-pin)

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Compaq 10/100 TX PCI Intel UTP Controller (NIC)

Table 5-8
NIC Specifications

Network Interface	10Base-T/100Base-TX
Compatibility	IEEE 802.3/802.3u compliant
Data Transfer Method	32-bit bus-master PCI
Network Transfer Rate	
10Base-T (Half-Duplex), 10Base-2	10 Mb/s
10Base-T (Full-Duplex)	20 Mb/s
100Base-TX (Half-Duplex), 100VG-AnyLAN	100 Mb/s
100Base-TX (Full-Duplex)	200 Mb/s 1 extemal (68-pin)
Connector	RJ-45
Cable Support	
10Base-T	Categories 3,4 or 5 UTP (2 or 4 pair); up to 100 m (328 ft)
100Base-TX	Category 5 UTP (2 pair); up to 100 m (328 ft)

Compaq 10/100 TX PCI UTP Controller (NIC)

Table 5-9
NIC Specifications

Network Interface	10Base-T/100Base-TX
Compatibility	IEEE 802.3/802.3u compliant
Data Transfer Method	32-bit bus-master PCI
Network Transfer Rate	
10Base-T (Half-Duplex), 10Base-2	10 Mb/s
10Base-T (Full-Duplex)	20 Mb/s
100Base-TX (Half-Duplex), 100VG-AnyLAN	100 Mb/s
100Base-TX (Full-Duplex)	200 Mb/s 1 extemal (68-pin)
Connector	RJ-45
Cable Support	
10Base-T	Categories 3,4 or 5 UTP (2 or 4 pair); up to 100 m (328 ft)
100Base-TX	Category 5 UTP (2 pair); up to 100 m (328 ft)

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Non-Hot-Plug Ultra2 Hard Drives

Table 5-10
Non-Hot-Plug Ultra2 Hard Drive Specifications

	4.3 GB	4.3 GB	9.1 GB	9.1 GB	18.2 GB
Rotational Speed (rpm)	7200 rpm	10,000 rpm	7200 rpm	10,000 rpm	7200 rpm
Logical Capacity (MB)	4290.6 MB	4290.6 MB	9100.0 MB	9100.0 MB	18209.8 MB
Height	One-Third	One-Third	One-Third	One-Third	Half
Inches	1.0	1.0	1.0	1.0	1.6
Centimeters	2.5	2.5	2.5	2.5	2.5
Size					
Inches	3.5	3.5	3.5	3.5	3.5
Centimeters	8.9	8.9	8.9	8.9	8.9
Interface	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI
Transfer Rate Synchronous (Max)	80 MB/s	80 MB/s	80 MB/s	80 MB/s	80 MB/s
Seek Time (typical, including settling)					
Single Track	0.8 ms	0.8 ms	1.9 ms	0.8 ms	0.8 ms
Average	8.8 ms	5.4 ms	7.5 ms	5.4 ms	6.9 ms
Full Stroke	17.0 ms	12.2 ms	15.0 ms	12.2 ms	15 ms
Physical Configuration					
Bytes/Sector	512	512	512	512	512
Logical Blocks	8,380,080	8,380,080	17,773,524	17,773,524	35,565,080
Operating Temperature					
Fahrenheit	50° to 95°	50° to 95°	50° to 95°	50° to 95°	50° to 95°
Celsius	10° to 35°	10° to 35°	10° to 35°	10° to 35°	10° to 35°

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Non-Hot-Plug Wide-Ultra Hard Drives

Table 5-11
Non-Hot-Plug Wide-Ultra Hard Drive Specifications

	4.3 GB	4.3 GB	9.1 GB
Rotational Speed (Rpm)	7,200 rpm	10,000 rpm	7,200 rpm
Logical Capacity (MB)	4293 6 MB	4293.6 MB	9100 MB
Height	One-Third	One-Third	One-Third
Inches	1.0	1.0	1.0
Centimeters	2.54	2.54	2.54
Size			
Inches	3.5	3.5	3.5
Centimeters	8.9	8.9	8.9
Interface	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3
Transfer Rate Synchronous (Max)	40 MB/s	40 MB/s	40 MB/s
Seek Time (typical, including settling)			
Single Track	0.8 ms	0.8 ms	1.9 ms
Average	8.8 ms	5.4 ms	7.5 ms
Full Stroke	17.0 ms	12.2 ms	15.0 ms
Physical Configuration			
Bytes/Sector	512	512	512
Logical Blocks (in millions)	8,386,000	8,386,000	17,773,500
Operating Temperature			
Fahrenheit	50° to 95°	50° to 95°	50° to 95°
Celsius	10° to 35°	10° to 35°	10° to 35°

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Hot Plug Ultra2 Hard Drives

Table 5-12
Hot-Plug Ultra2 Hard Drive Specifications

	4.3 GB	4.3 GB	9.1 GB	9.1 GB	18.2 GB
Rotational Speed	7200 rpm	10,000 rpm	7200 rpm	10,000 rpm	7,200 rpm
Logical Capacity	4290.6 MB	4290.6 MB	9100.0 MB	9100.0 MB	9100.0 MB
Height					
Inches	1.0	1.0	1.0	1.0	1.6
Centimeters	2.5	2.5	2.5	2.5	4.6
Size					
Inches	3.5	3.5	3.5	3.5	3.5
Centimeters	8.9	8.9	8.9	8.9	8.9
Interface	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI	Wide Ultra2 SCSI
Transfer Rate (Synchronous (Max)	40 MB/s	40 MB/s	40 MB/s	40 MB/s	40 MB/s
Seek Time (typical, including settling)					
Single Track	0.8 ms	0.8 ms	0.8 ms	0.8 ms	0.8 ms
Average	8.8 ms	5.4 ms	7.9 ms	5.4 ms	5.4 ms
Full Stroke	17.0 ms	12.2 ms	17.0 ms	12.2 ms	12.2 ms
Physical Configuration					
Bytes/Sector	512	512	512	512	512
Logical Blocks (in millions)	8,380,080	8,380,080	17,773,524	17,773,500	17,773,524
Operating Temperature					
Fahrenheit	50° to 95°	50° to 95°	50° to 95°	50° to 95°	50° to 95°
Celsius	10° to 35°	10° to 35°	10° to 35°	10° to 35°	10° to 35°

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Hot-Plug Wide-Ultra Hard Drives

Table 5-13
Hot-Plug Wide-Ultra Hard Drive Specifications

	4.3 GB	4.3 GB	9.1 GB	9.1 GB	18.2 GB	18.2 GB
Rotational Speed (rpm)	7,200	10,000	7,200	10,000	7,200	10,000
Logical Capacity (MB)	4293.6	4293.6	9100	9100	18209.8	18209.8
Height	One-Third	One-Third	One-Third	One-Third	Half	Half
Inches	1.0	1.0	1.0	1.0	1.6	1.6
Centimeters	2.5	2.5	2.5	2.5	2.5	4.6
Size						
Inches	3.5	3.5	3.5	3.5	3.5	3.5
Centimeters	8.9	8.9	8.9	8.9	8.9	8.9
Interface	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3	Wide-Ultra SCSI-3
Transfer Rate Synchronous (Max)	40 MB/s	40 MB/s	40 MB/s	40 MB/s	40 MB/s	40 MB/s
Seek Time						
Single Track	0.8 ms	0.8 ms	0.8 ms	0.8 ms	0.8 ms	0.8 ms
Average	8.8 ms	5.4 ms	7 9 ms	5.4 ms	6.9 ms	5.7 ms
Full Stroke	17.0 ms	12.2 ms	15.0 ms	17.0 ms	12.2 ms	15.0 ms
Physical Configuration						
Bytes/Sector	512	512	512	512	512	512
Logical Blocks (in millions)	8.386,000	8.386,000	17,773,500	17,773,500	35,566,000	35,566,000
Operating Temperature						
Fahrenheit	50° to 95°	50° to 95°	50° to 95°	50° to 95°	50° to 95°	50° to 95°
Celsius	10° to 35°	10° to 35°	10° to 35°	10° to 35°	10° to 35°	10° to 35°

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